RXMWHUK23RP

DeliveryX

DeliveryX

Warehousing

2023

In partnership with:

Avalara | RHENUS LOGISTICS

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Editor's Introduction

The warehouse has always been a key part of the retail journey, originally built to stock stores, the boom in ecommerce has seen these sites adapt to keep up with the constantly evolving world of retail.

The increasing emphasis on omni-channel offerings has led to warehouse facilities becoming dynamic and agile environments. With changing customer demand, both from the retailers and end customers, businesses within the warehouse sector are having to rethink the size, location and even specifications of their facilities.

Warehouses are not only places to hold inventory before it goes to a physical store, they are now also direct-to-consumer fulfilment centres and critical to the returns and reverse logistics process.

As the demand for speedy delivery ramps up, competition for warehouse space in strategic locations is putting pressure on those looking to grow. Demand for Big Sheds within the 'Logistics Golden Triangle', located around Magna Park, Lutterworth, will long continue. But there is also a new breed of smaller, urban hubs popping up across UK cities and towns to meet the new last mile needs.

Designed to be much closer to residential and business customers, urban industrial sites will increasingly serve as an integral part of the ecommerce delivery process.

Whatever the size of the warehouse, these sites are becoming technology-driven and automated to keep pace with the demands of retail. Ensuring stock is available, can be picked and shipped as quickly and efficiently as possible is seeing many warehouses introducing both artificial intelligence and robotics.

This technology is also being deployed to help warehouses grow into green spaces. As retailers work to ensure they are sustainable, the buildings which hold and distribute the stock also need to be environmentally friendly.

All of this combined, the demand, the technology and the sustainability goals, has created an interesting warehouse sector now spread across the UK. While shoppers do not necessarily need to know what happens in this element of ecommerce, it is a critical cog in the online shopping operation. Without an efficient functioning warehouse, retailers will struggle to give their customers what they want, and retain them through what could be another challenging year.

Katie Searles, Editor, DeliveryX

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Stepping into a sustainable future, today

For your complete sustainable warehousing solution

With over 30 years of experience and expertise in providing warehousing, fulfilment, value-added services and returns processing to multi-channel retailers and brands, customers trust us to be a safe pair of hands. Our facilities reach the highest level of sustainability in warehousing and promote happiness, health and wellbeing, putting Rhenus at the forefront of sustainable logistics.

We are always thinking about tomorrow, today!

Contact us to discuss your warehousing requirements

Rhenus Warehousing Solutions UK, Vulcan Way, Magna Park, Lutterworth, Leicestershire, LE17 4XR

01455 200700 // **warehousing.enquiries@uk.rhenus.com** // **www.rhenus.group/uk**

RHENUS LOGISTICS

Expert insight

Kerry Delaney, Regional Managing Director, Europe North & West, Rhenus Warehousing Solutions

How can modern warehouses and distribution centres ensure they operate in a sustainable way, as well as efficiently?

With the need for sustainable and efficient warehousing solutions more acute than ever, our upcoming Rhenus Campus in Nuneaton is an excellent example of how to adapt to these needs.

The campus will be much more than just warehouses. The first warehouse is already certified 'BREEAM Outstanding' with the second on track to be certified too, meaning it will be a highly sustainable environment that enhances the health and wellbeing of our employees. It has been designed with reference to the UK Green Building Council (UKGBC) Framework Definition for Net Zero Carbon Buildings, with reductions to embodied carbon made throughout the design and construction phases and also will utilise solar panels, air source heat pumps and electric car charging points in the car park.

The development will include the latest innovations in technology and automation to ensure speed and accuracy, such as goods-to-person autonomous mobile robots. The campus will also be a wonderful place to work, with designated wellbeing facilities.

There have been reports of labour shortages across the sector, what can be done to ease this?

At Rhenus we are able to adapt to changes in the labour market through a combination of sophisticated work flow planning and automation, allowing us to utilise our teams in the most impactful way at any given time and respond proactively to changes in the sector. Our Nuneaton location was chosen due to the high availability of skilled labour and strong transport connections, with our commitment to staff wellbeing allowing us to retain a strong base of dedicated employees who deliver excellent work.

With the growth of ecommerce, we have also seen a growth of returns, how critical is reverse logistics in the returns process?

The growth of ecommerce in recent years means that reverse logistics is more important than ever. This has proven to be a real challenge for some retailers as their internal warehousing systems are no longer able to keep up with the increased workload that comes with a high volume of returns.

This is an area where Rhenus provides real value to its customers, as we can process returns in a way that is reliable, fast, cost-effective and environmentally-friendly. We embrace innovative technology to ensure that returned purchases are processed back into stock quickly, in a re-sellable condition, helping to reduce the amount of clothing and other items that end up in landfill.

Will advancing technology and innovation be the key to warehouse operations in 2023?

Technology plays an important role in optimising our customers' supply chains, as it ensures that labour is utilised efficiently. Some of the innovations the Rhenus Group offers include AutoStore, which optimises the utilisation of space through the use of robotics, and Cabot, a robotic arm that boosts productivity by taking the burden of lifting heavy objects away from employees, making their jobs safer and less strenuous.

RHENUS LOGISTICS

About Rhenus Warehousing Solutions

Rhenus is one of the pioneers in warehouse logistics and forms a comprehensive global network with more than 180 locations in 23 countries and 4.0 million square metres of warehouse space. Specialised in numerous industries, Rhenus customers benefit from tailor-made warehousing solutions and fulfilment services. At multi-user locations and for dedicated and in-house solutions, the main focus is on innovation, sustainability and continuous process optimisation.

About Rhenus

The Rhenus Group is one of the leading logistics specialists with global business operations and annual turnover amounting to EUR 7.0 billion. 37,500 employees work at 970 business sites and develop innovative solutions along the complete supply chain. Whether providing transport, warehousing, customs clearance or value-added services, the family-owned business pools its operations in various business units where the needs of customers are the major focus at all times.

Avalara

Tax compliance done right

Tax complexity shouldn't stop you growing around the world

Expanding your business across international borders is a huge task, and there's a lot of moving parts you'll need to oversee to make sure things run smoothly. Why do it all alone?

Avalara supports some of the fastest growing businesses around the world. We have a huge range of helpful guides and digital solutions that can help you with everything from VAT calculations and returns to finding a fiscal representative and getting the right HS codes for international shipping.

– Reduce tax compliance risk
– Lightning-fast calculation
– Ease of integration
– Smoother customs clearance
– Simplify manual tasks
– Delight your customer

avalara.com/launch-expand

Are you selling far and wide to customers all over the world?

Your compliance duties mount as your business grows. Our range of cross-border solutions will easily and automatically handle everything from applying VAT and GST to flagging border tariffs and filing international taxes.

Are you selling into EU member states, from either within or outside the EU?

Avalara makes it easier to sell and grow in the world's largest trading bloc. Automation puts your VAT returns on autopilot, while Avalara Import One Stop Shop (IOSS) solution simplifies registration and enhances customer experience.

Are you selling goods in the U.S. and Canada?

Stay on top of changes to tax jurisdiction boundaries and rules defining which of your products and services are taxable, with exact and instant calculations.

Expert insight

The importance of automation & warehouse expansion since Brexit - John Chiswell, Cross Border Solutions Manager at Avalara.

Automation is massively important to cross-border trade, especially following the changes to the market after Brexit.

For example: understanding Harmonised System (HS) codes and keeping up to date with the many post-Brexit changes in-house, can be a nightmare for most companies. While there are resources available on the Internet that customers can look at when applying HS codes, many sources are either overcomplicated or offer conflicting information.

Thankfully digital solutions like those offered by Avalara allow you to stay compliant and up to date with any changes as they occur. Additionally, automating your cross-border solution removes the human element of compliance that often leads to numerous errors.

Throughout COVID and pre-Brexit, we found that retailers were moving away from traditional distance selling; which saw UK businesses transporting goods across borders to customers in Europe. Yet, post-Brexit, we have seen that retailers are using third-party logistics solutions and fulfilment centres, as well as warehouses located across Europe.

Using third-party logistics, retailers can hold their products in local warehouses and get them to customers far more efficiently. This can also erase many of the complexities surrounding cross-border tariffs; like customs duties and import taxes.

However, expansion goes further than the EU. At Avalara, we've seen that many of our customers trading in the U.S. also use third-party logistics partners on a state-by-state basis, to ensure that American customers get their items faster.

The benefits of bonded warehousing & an automated HS Code system - Lyndsey Robinson, EMEA Customs Manager, Avalara

Goods moving between the EU and the UK receive preferential tariffs due to the rules of origin. However, if goods are brought into the UK from the EU (or visa-versa) and have cleared customs but are then sent back to their country of origin (or exported to a third country), they will not be classified as preferential trade.

But bonded warehouses can help facilitate preferential trade, as goods sent to these locations will not have to go through customs. Items transported to bonded warehouses are still included as preferential trade, even if they return to the country of origin or are exported to another country.

Due to their complexities, certain HS codes can be confusing for those who aren't cross-border experts. So, having an automated tool for item classification can demonstrably help businesses remain compliant. By preventing customs delays due to incorrect codes, the software also helps ensure products arrive on time.

Technology also allows businesses to stay aware of any changes to customs duty or VAT rates. Keeping track of when these rates rise is crucial to ensuring that your business can gauge when it is time to either increase or decrease activity in a particular market and therefore stay competitive.

Avalara

At Avalara, we understand that automation is vital to reducing supply chain disruption and helping cross-border trading. Following Brexit, third-party logistics and fulfilment centres continue to grow and sell to customers overseas. Our experts and automated solutions are well-positioned to help U.K. retailers sell internationally.

Market context

Ecommerce growth, and firms returning to its shores, has created record demand for warehouse space in the UK

Warehousing has always been a critical part of retail, and the pandemic-fuelled rise of ecommerce has generated record growth for the sector across the globe. With increasing amounts of stock shipped directly to consumers, demand for warehouses is surging. It is predicted that in 2023 there will be 167,500 warehouses worldwide, reaching just under 180,000 by 2025.

It is not just the sheer volume of facilities, the size of the spaces themselves is increasing. American commercial real estate firm CBRE estimated that for each incremental US$1bn in growth in ecommerce sales, there needs to be an additional 1.25m sq feet of distribution space to support it [1].

The demand for space isn't limited to the US. In Europe there was close to 22.9 million sqm of logistics warehouse space taken up during Q1-Q3 of 2022 [2].

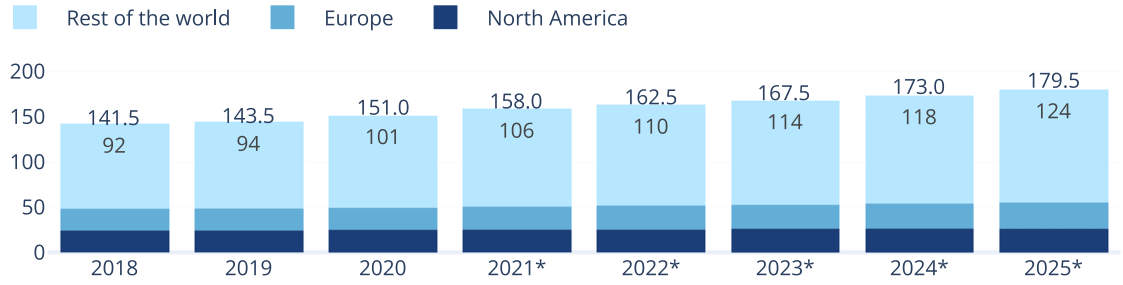
This in turn drives investment in real estate, in 2021 Sweden invested €5.6bn in logistics properties, with France forking out €6.7bn and Germany close to €10bn (€9.89bn).

UK BRINGS OPERATIONS CLOSER TO HOME

While the ecommerce boom has inspired warehouse investment across the world, the UK has also had to

Due to the boom in ecommerce, the number of warehouses worldwide is expected to reach just under 180,000 by 2025

Number of warehouses worldwide from 2018 to 2025, by region (in 1,000s)



Survey period 2018 to 2020. *Forecast

Source: Statista estimates; Interact Analysis

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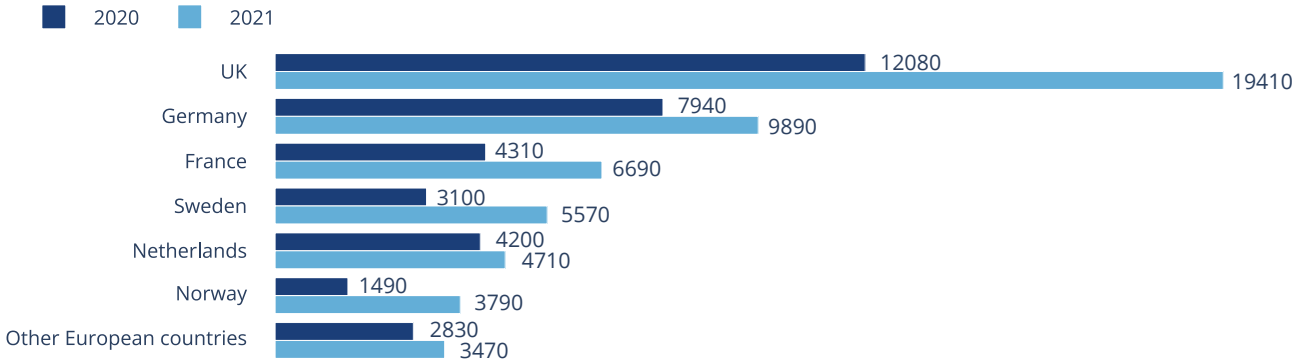
Investment in industrial real estate is highest in UK

Industrial & logistics investment in real estate market, Europe, 2020-2021, by country (mn EUR)



Source: BNP Paribas Real Estate

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deal with the fallout from Brexit. It has had to adjust its supply chain after exiting the European Union, with many transport, logistics and warehouse operations looking to reshore.

Data from the Office for National Statistics (ONS) shows that the number of UK business premises classified as transport and storage was 88% higher in 2021 than in 2011, and 21% higher than in 2019 [3].

The ONS also highlighted that growth is concentrated in an area in the West Midlands, known as the 'Golden Logistics Triangle'. While this triangle has been around for decades – originating in the late 1980s at Magna Park in Lutterworth – its expansion has resulted in it covering 289 square miles.

Furthermore, 'transport and storage' is now the largest industry in parts of the Midlands, the East of England and Yorkshire and The Humber, in terms of share of business units.

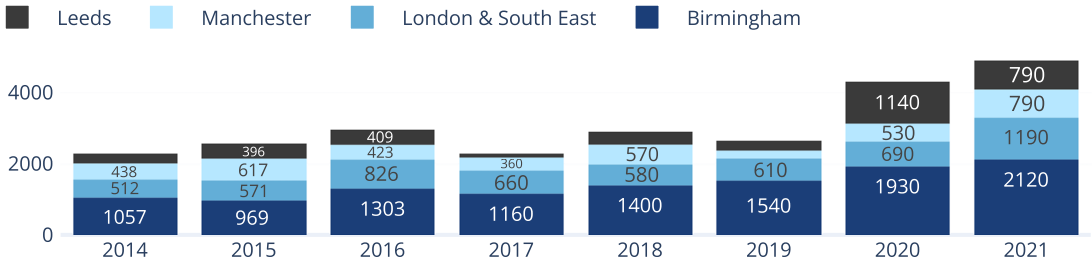
With businesses aiming to get as close to their customers as possible, thereby reducing transportation costs, facilities in connected and central locations are always going to be popular. It is, therefore, no surprise that in the UK capital there is a high level of competition for warehouses, while space is especially scarce in Wales.

PUSHING RATES UP

The lack of warehouse space is compounded by increasing construction costs and supply chain delays. It is not as simple as building more new units. Furthermore, there is decreasing availability of secondhand sites.

Take-up rate for warehouses keeps increasing in UK

Annual take-up rate for warehouses in the United Kingdom (UK) from 2014 to 2021, by city (in 1,000 square metres)

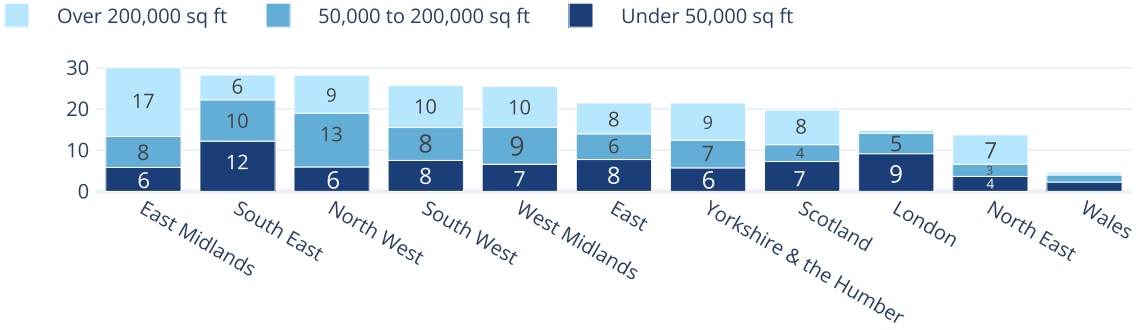


Warehouses sized over 5,000 square metres, Q4 2014 to Q4 2021

Source: BNP Paribas Real Estate

Available warehouse space is especially scarce in Wales

Warehouse space available in different regions in the UK May 2022, by size class (in million square feet)



May 2022

Source: Statista

This supply-demand imbalance has also created a hike in rental rates. Similar to the housing market, rents in London and the South East are the highest for warehousing space.

LABOUR ISSUES

On top of the expense and lack of availability of physical warehouse space, companies are also struggling to find staff to work in them. ONS data highlights the mismatch, and while the number of warehouse premises has almost doubled in the last 10 years, employment in the sector was only 20% higher in December 2021 compared with the same month in 2011 [4].

ONS added the difference in growth rates reflects recent worker shortages, and the potential automation of some occupations.

In fact, many businesses are turning to automation technology to fill the labour gap, take some of the manual pressures of a warehouse environment, and make the most of the space they have got.

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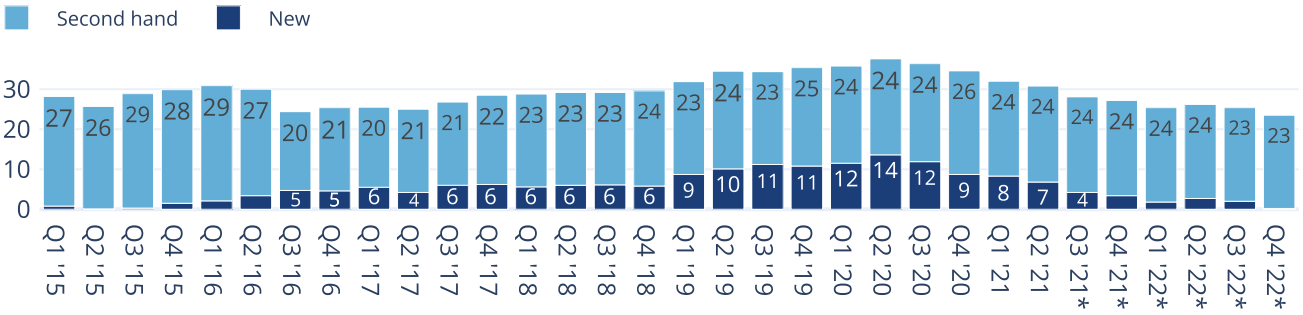
[2]https://www.jll.co.uk/en/trends-and-insights/research/european-logistics-market-update-november-2022

[3]https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/articles/theriseoftheukwarehouseandthegoldenlogisticstriangle/2022-04-11

[4]https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/articles/theriseoftheukwarehouseandthegoldenlogisticstriangle/2022-04-11

Supply of warehouses in the UK is projected to keep decreasing

Projected supply of warehouses based on speculative delays in the UK 2015-2022 (in million square feet)



Figures rounded, Q1 2015 to Q2 2021. The source does not specify the size of warehouses included. * Forecast.

Source: Savills

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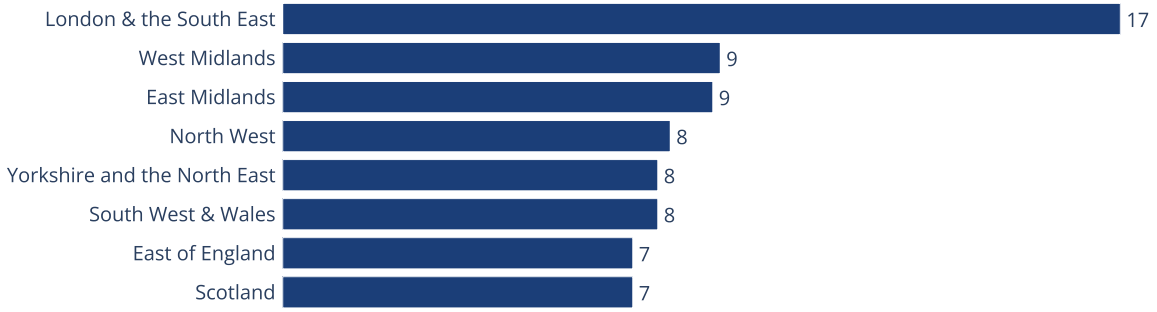
London and the South East is the most expensive region in terms of prime industrial rents

Prime rent for big-box warehouses in the UK, 2022, by region (in GBP per square foot)



Quoting Grade A rent of warehouses over 100,000 square feet, Q1 2022

Source: Savills

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Robotics and automation

Warehouse technology has come a long way from conveyor belts and workers pushing trolleys

Demand on space and labour has led to warehouses across the UK turning to automation, robotics and artificial intelligence (AI) to become as efficient, and as safe, as possible. When looking at the type of technology installed in these warehouses, there is a differentiation between those used to replenish bricks-and-mortar stores and those sites purely for ecommerce fulfilment.

For more traditional retail warehouse models, automation is used to handle large bulky cases and pallets. Whereas, for direct-to-customer orders the technology needs to be able to handle individual items. This means it has to be flexible, agile and in some cases able to make decisions in real-time.

Warehouse technology can be hand-held, wearable or even require no human intervention at all. Whether Automated Guided Vehicles (AGVs), which follow predefined paths, or Autonomous Mobile Robots (AMRs), that can understand and move through environments without being overseen directly by an operator, warehouses are deploying robots for a series of labour intensive tasks. This is especially true in ecommerce, which requires a high degree of flexibility.

Furthermore, collaborative robots (cobots) are also being installed to take the strain of picking and packing operations.

Rueben Scriven, warehouse automation analyst, explains to best understand the adoption of robotics in ecommerce warehousing simply think about it in terms of the workflows.

There is receiving, storage, buffering, picking, and then staging and loading.

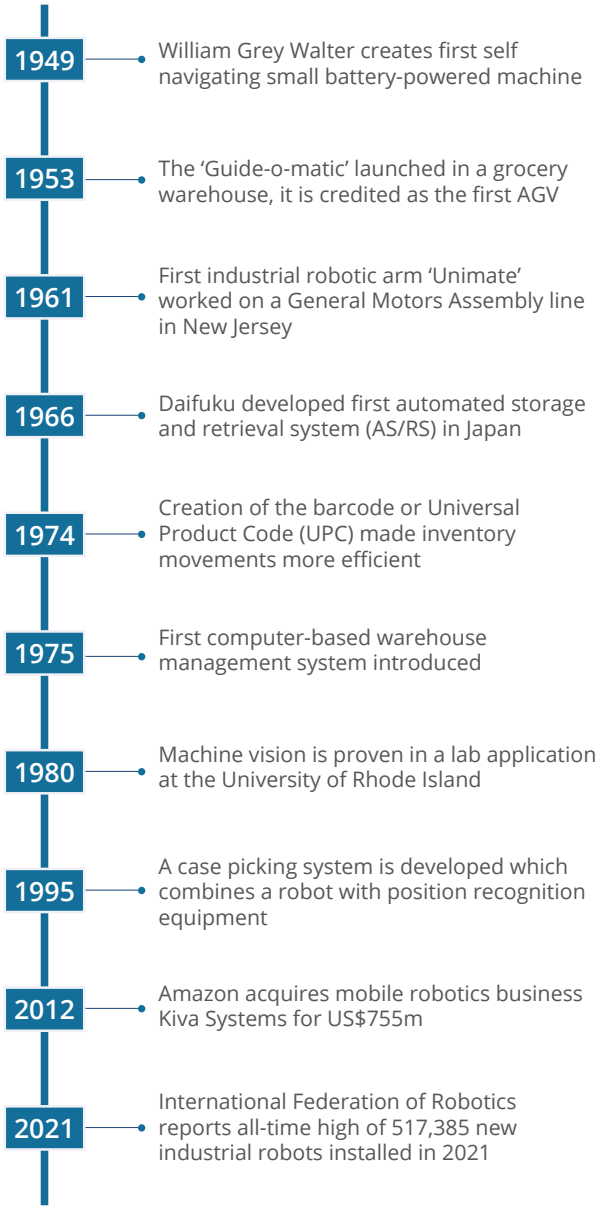
“Each of those different workflows has a myriad of different types of technologies being used, either fixed or mobile automation,” Scriven notes.

For omnichannel operations mobile automation is particularly important due to the need for agility. While earlier fixed automated systems did not possess any flexibility, the advancing mobile solutions provide the opportunity to scale up with changing demands.

ROBOT VS HUMAN

Providing ecommerce warehouses with adaptability is one clear benefit of deploying robotic technology. These technologies also have the potential to take on strenuous, repetitive tasks from warehouse workers. Industry experts will stress that any fear of robots taking human jobs should be quashed. Scriven states: “robotics has never led to someone getting fired.”

He continues: “Robotics are really used to add additional value and allow people to do alternative work, which provides more value to the company. It’s not that there’s a fixed amount of work that they



have to do, and if they bring in robots it means less labour. It means that if they bring in automation they can use their existing labour to generate better and more efficient operations."

Interact Analysis has mapped the labour spend per warehouse with the automation spend per warehouse. It found an "almost perfect linear line" where as labour spend per warehouse goes up, automation spend per warehouse also increased in a corresponding manner.

Furthermore, it found that the UK has the highest automation spend per warehouse out of any country in the world.[5]

ARTIFICIAL INTELLIGENCE

Before rolling out the robots to work alongside human operatives, companies will also require the right software to do so. And this is also becoming more advanced. Warehouse management software, which once used a simple algorithm, can now harness the power of AI for increased responsiveness.

AI can take into account a number of different variables. It can automate decision making and provides "dynamic intelligence". And similarly to its hardware companions, AI is incredibly good at "doing very monotonous tasks over and over again, and identifying patterns," Scriven explains.

It can go through vast amounts of data and flag things, which enables businesses to make informed decisions.

RENTING ROBOTS

The benefits of adopting AI and robotics in an ecommerce warehouse may be becoming increasingly clear to companies, but they also come with a large price tag. Some may question whether the initial large investment will be worth it.

There are new business models that may open doors for companies wishing to access automation without the down payment, including Robotics-as-a-Service (RaaS). AMR and cobot providers are leasing their solutions to businesses, with the opportunity to scale up or down when needed. On-demand automation can also come in the form of cloud-based subscription services for AI software.

Such RaaS offerings have the power to "democratisation automation" , notes Scriven, with medium-sized businesses able to benefit from robotics without the often cost-prohibitive investment.

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ROBOTS EVERYWHERE

Introducing robots and AI into warehouses is one part of a wider increasingly advanced supply chain. There is the capability for autonomous shipping, self-driving logistics trucks and vans, alongside a last mile completed by lockable six-wheeled robots or drones.

There are a number of on-going trials throughout the UK, and US university campuses, that see grocery and take-away deliveries completed by robots which resemble cool-boxes on wheels. Initially controlled by a human-operative, these systems feature a range of sensors to enable them to avoid obstacles in real-time.

For parcel deliveries, firms including FedEx, DHL and Ford, are investigating the use of self-driving vehicles. Often zero-emission, these unmanned platforms are able to carry 500kg and can cover 100km on a full charge.

While for longer distances, and even larger loads, autonomous 18-wheelers have already been used on freeways in the US, with similar trials in China and in European countries including Germany and Sweden.

But these systems are not only on the world's roads, they are also taking to the seas and skies. In April 2022, the International Maritime Organization started the development of a goal-based instrument regulating the operation of maritime autonomous surface ships (MASS). The UK Civil Aviation Authority is working on a concept for routine Beyond Visual Line of Sight flights for drones. While such regulations, proof-of-concepts and trials will take some time, robotic delivery could be the future.

Micro-fulfilment

Could small urban logistics hubs be the future of ecommerce fulfilment and last mile delivery?

Once upon a time distribution centres would have been 'Big Sheds' facilities with strong connections to the UK's motorway network. And while these sites will always serve a vital purpose to the ecommerce logistics sector, there is a new kind of distribution hub – the micro-fulfilment centre (MFC).

MFCs are by definition small, and often highly automated. These hubs are designed to fulfil ecommerce orders, as well as local store pick-ups. MFCs may be located in an existing store or warehouse, or be a standalone small distribution or warehouse space in an urban setting.

It is their urban location which is key, these MFCs are intended to be hyperlocal, close to the end customer with the potential to both speed up delivery and make it greener.

Cross River Partnership, a non-profit organisation working for positive change in London, champions MFCs as these urban hubs "have an important role to play in promoting healthy and efficient deliveries".

Such MFCs can reduce the number of vehicle trips and, as a result, congestion, by enabling deliveries to be made in electric vehicles, by bike or on foot. This in turn reduces harmful exposure to toxic air pollutants.

The MFC boom has in part been driven by the rapidly evolving ecommerce delivery models. With consumers demanding quick and green deliveries, these sites can facilitate more sustainable forms of logistic vehicles (see side panel).

STRIKING THE RIGHT BALANCE

Parcels coming into these very central sites have to start their journey somewhere, and this is often where the existing warehousing network comes in.

Larger sites will still be needed for inbound logistics, for storage reasons and for fulfilment purposes. Micro-hubs are not a replacement for the existing model, more of a supplement.

In a recent interview with DeliveryX, Jonathan Jenssen, CEO of delivery start-up Relay Technologies, stressed that the traditional warehouses still need to be respected. It is after all where a retailer's inventory sits. He added that we can't expect businesses to turn their back on big warehouses which have cost millions of pounds of investment.

"We need to ask, with that positioning of their inventory and warehousing, how do we maximise the delivery experience from whatever possibilities that they have," explains Jenssen.

MFCs can be seen as a "pit-stop" in the ecommerce journey. These small sites play a key part in maximising delivery efficiency and therefore the end-customer experience.

ON YOUR BIKE

Urban areas are under increasing pressure to clean up air quality. Many UK cities already operate charging zones for the most polluting vehicles. London has announced the expansion of its Ultra-Low Emission Zone (ULEZ), with the new boundary reaching the edge of the Greater London Authority area. Clean Air Zones (CAZs) are also currently operating in Bath, Birmingham, Bradford, Bristol, Portsmouth, Sheffield and Tyneside, with Greater Manchester's under review.

While some delivery firms navigating these zones will choose to switch to zero emission vans, others operating in congested built-up areas are driving them to select pedal-powered options.

Bikers with large back-packs, cargo bikes and even electric cargo bikes offer urban logistics firms the ability to navigate not only CAZs but the growing number of Low Traffic Neighbourhoods. In fact, there are many congested streets where a bike could potentially be quicker than a car or van, and they do not have to hunt for a parking space.

The growing number of delivery bikes is only possible due to central distribution hubs, even an e-cargo bike would struggle to reach city-limit depots. But the rolling-out of such bikes is also driving businesses to rethink their fulfilment operations, with retailers teaming up with last mile start-ups to ensure sustainable and speedy delivery from city centre hubs.

REPURPOSING RETAIL SPACE

Competition for strategic warehousing and distribution space, whether large or small, has led to some developers looking at existing, perhaps unused, facilities to convert.

With former retail outlets sitting empty, investors are taking advantage of strong rental growth in the logistics sector. In some cases the logistics element is integrated into the retail offering, while some sites are completely converted.

One-time retail units have the benefit of being located in densely populated areas, proving a perfect location for quick delivery. While neglected retail parks have the connection to key road networks. Industrial property company Prologis purchased Ravenside Retail Park, 15km from central London, for £51.4m and has earmarked the site for ecommerce fulfilment.

It is not only former shops that are being repurposed as ecommerce sites. British Land is working to turn empty car parks into urban distribution sites for same-day delivery firms.

The property company, which owns Sheffield's Meadowhall shopping centre, aims to spend £189m on assets with "urban logistics potential". This includes sites in central London where British Land could buy warehouses and build additional floors onto existing ones before renting these out to retailers providing rapid delivery in the UK capital.

It has already acquired a £20m underground car park in Finsbury Square, central London. Subject to planning, work will begin in 2024 to convert the site into a last mile logistics complex. Parcels from further afield will be dropped off, stored and then picked up for delivery around the city.

SHIP FROM STORE

It is not only former shops, and car parks, that are playing their part in the ecommerce journey. Some retailers are taking advantage of their open bricks-and-mortar locations for ecommerce fulfilment.

Similar to urban MFCs, shipping directly from a store enables deliveries to be made from closer to the customer. Thus, there is less lead time required and potentially less transportation cost associated when filling orders.

Furthermore, a ship-from-store strategy increases the footprint of the company's warehouse by using storefronts as mini distribution centres, while reducing the carbon footprint by using locally held stock to fulfil orders.

As ecommerce's market share continues to gain on physical retail, shipping directly from stores could help reduce demand on warehouses while making the most of high street sites.

It might not be the best option for all retailers however, as smaller firms may struggle with the space and staff needed. Yet again it comes down to finding the right balance, and retailers choosing the best fulfilment model for their business.

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British Land plans to turn a former underground car park in central London into a last mile logistics hub

Sustainable warehouses

Consumers are requesting green products, packaging and delivery, but there is a sizeable opportunity in warehouses to start that sustainability journey

Across all stages of the ecommerce process sustainability is becoming increasingly important. Switching to electric vehicles, scrapping single use plastics and ensuring transparency in the supply chain are all steps that businesses are taking.

But as 25% of UK greenhouse gas emissions in the UK come from buildings and infrastructure, the sheer size of warehouse space provides a unique set of challenges and opportunities for going green. According to the UK Green Business Council (UKGBC) newly constructed buildings are more energy-efficient. However, 80% of the buildings which will exist in 2050 have already been built. UKGBC stressed that a major priority is decarbonising the existing stock [6].

IT'S WHAT'S INSIDE THAT COUNTS

Introducing a range of energy saving equipment into current warehouse facilities is one way to make these sites more sustainable, and also more efficient.

Lighting is a good place to start as typically it is one of the largest contributors to a warehouse's energy demand. And even the simplest of changes can lead to dramatic results. LED lighting can be up to 80% more efficient than traditional lighting. It can also last up to 25 times longer than conventional sources, which in turn reduces maintenance costs.

Introducing lighting sensors can also help monitor and reduce consumption. Motion sensors are designed to ensure the lights are only on when they need to be, and with a connected system energy use and money can be saved at the same time.

There is also the good, old fashioned Reduce, Reuse, Recycle approach. Warehouse operators should work to reduce packaging where possible, reuse pallets and other materials whenever the option exists and recycle all possible materials.

ON THE OUTSIDE

While on the exterior of the buildings there is room for sustainable innovations, such as solar photovoltaics (PVs). The UK's 20% largest warehouses can provide 75 million square metres of roof space, and the total amount can enable room for up to 15GW of new solar.

In October 2022, the UK Warehousing Association (UKWA) held a roundtable discussion at the House of Lords to showcase this power of solar PVs on warehouse rooftops. It argued that such installations could not only double the UK's solar capacity, but also reduce harmful carbon emissions, conserve land and slash energy costs.

Placing solar PVs onto warehouse roof space not only avoids the need to develop new land, equivalent to the footprint of 500,000 houses, but also could save the industry £3bn per year in energy costs [7]. These panels can power the warehouse while significantly reducing the environmental impact, potentially reducing CO2 emissions by 2 million tonnes/year, but can also power sustainable infrastructure, such as electric vehicle charging stations. This will be critical in supporting the transition away from fossil-fuelled vehicles.

Whether inside or outside, the UK's warehouses have their part to play in making ecommerce more environmentally friendly.

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Solar panels installed on the roofs of warehouses not only reduced the environmental impact but also provide secure electricity at a lower cost

Expert interview

***DeliveryX* editor Katie Searles spoke to UK Warehouse Association (UKWA), CEO, Clare Bottle about the UK's warehousing landscape.**

When asked about the emergence of micro-fulfilment hubs, bottle responded with her own question: what is a warehouse?
That really interests me because you've got data centres, you've got vertical farming, you've got dark kitchens. All of these in the broadest sense could be described as warehouses as well.

What we're seeing is increased demand for bigger and smaller buildings. Medium sized buildings are not as popular anymore. If you go back even 10 years, there were probably a dozen warehouses that were a million square feet. There might be a hundred now.

Those huge facilities are becoming increasingly popular. Partly because if you're going to implement automation at scale it makes sense to reduce the number of sites you have and increase the size of those sites.

Amazon - the biggest player - they've probably got 30 enormous warehouses, but then what they've also got is hundreds and hundreds of local delivery centres. That's a similar story with a lot of ecommerce players. You need big buildings and tiny ones that are closer to the customer.

It begs a question about planning permission as well, there's a consultation out at the moment about reforming the arrangements of the planning and permission that might be quite important for making sure that land use is aligned with needs. It is a balance between the economy, society, and the environment.

Are we doing the right thing by using these buildings for these purposes? That's the question that local planners need to answer.

As the ecommerce boom slows, will demand on UK warehousing and that land start to decrease?
The growth in warehousing isn't just about ecommerce. There's been quite a lot of volatility in supply chains. Even businesses that are holding raw materials for manufacturing tend to hold more.

Some of that is localised to the UK and you might attribute it to Brexit. The fact that it's more difficult to move goods - people are holding more goods in the UK for that reason. Some of it is a wider problem to do with availability of commodities like micro-chips or the cost of steel, and people are just taking a different approach to how they manage inventory in their supply chain.

There are various different factors at play, it's oversimplifying it to say 'oh well ecommerce has calmed down so warehousing needs to get back in its box', there's a bit more to it than that.

There's still quite a lot of uncertainty. People want to hold more stock, but of course the risk of holding more stock is that you might end up with overstock.

Then there are short shelf life products, things like yoghurt, you never hold loads of stock because it doesn't work like that.

Where it becomes more difficult is when you're trying to trade off your demand plan against a sort of medium term shelf life of whatever it is that you're holding. For example in car parts, if you withdraw a car off the market you still have to be able to support the maintenance of that vehicle for at least 15 years. They're not obsolete and you're not allowed to delist them.

There are different inventory strategies that apply in different supply chains, but on balance, everybody's holding a bit more stock than they used to.

We have seen reports of retailers left with overstock even after the sales, after Black Friday, and the January discounting, this must put a strain on warehouses?
Yes, absolutely. In textbooks they call it the bullwhip effect. I don't know what your personal arrangements were for toilet paper in the pandemic, but lots of people will have gone through a stage where they went out and panic bought a lot more than they needed, and then it will take a while for them to have used up all of that stock.

That's the bullwhip effect in a nutshell, and that happens on a grand scale in worldwide supply chains.

Is having your warehouses in the right location for your customers key to providing next-day, same-day, even rapid delivery?
Well, yes and no. There's actually quite a big difference between next-day and same-day in that regard. If you want to do a next-day service you can afford to be somewhere where you can get access to a really good labour market that might not be in the best geographical location for feeding into the networks because most of the parcel delivery networks are so good at doing next-day.

But even if you are sending in the goods from - well maybe not the far reaches of West Wales - somewhere like Bristol or Norwich, outside of the traditional golden triangle, you can still manage a next-day service quite adequately.

Of course the advantage there is that you might be able to locate your warehouse somewhere where there's cheaper land, cheaper property availability, and also more access to labour markets. If you try and recruit a forklift truck driver in Northampton - well, good luck with that.

On that labour shortages issue, is the introduction of technology, more automated warehouses, going to help?
There are lots of types of automation, but to summarise there are two ways that you could automate a warehouse. One of them - let's take Nestle as an example. They went out to tender, they've got a three-way deal between them GXO and Swisslog and they've built a brand new warehouse in the East Midlands. It's got to be one of the most automated warehouses I've ever seen. It will blow your mind. But that's a 20 year deal, that's a three-way partnership with a supplier of automation. It makes sense for a business like Nestle, who let's be fair, has quite a high profit margin of business. They also have really stringent customer service requirements to meet. They can make reasonable predictions about the future, about what consumer demand is gonna be like, and what they're going to want to use that building for.

At the other end of the market, there is a medium sized 3PL player, they may have two or three year contracts with their customers. They do not know exactly what the requirements are going to be in that building in 10 years time because they can't guarantee they're going to have the exact same customers anymore. If you go back even 10 years ago, those companies would say 'well, automation's not for me. I can't really invest'.

Now that's really changed and I think there's a couple of things that I've probably helped with that - the automation itself. You can hire a cobot, you can get Robots-as-a-Service, you can get six cobots that go around with your pickers and take away some of the drudgery of the work that they do.If you can build a decent software interface with your WMS, that's probably the biggest barrier. The availability of simpler forms of automation I think is one key part.

But there's the digital literacy of the workforce. It's a topic we've discussed quite a bit with some of our associate members that provide automation or digitalisation. Managers will often tell you: 'our workforce are resistant to change and they won't be able to deal with this'. But in fact they almost always underestimate the digital literacy of people in entry level jobs.

Everybody's grown up with a mobile phone. What the workers actually fear is not the digitisation, they fear that their bosses are going to potentially mess it up and they're going to end up picking up the pieces.

There's a mismatch there between people's expectations about these change projects. Change definitely needs to be well managed. You can try things out on a smaller scale, but you can also be a bit more ambitious because you can assume that most of your workforce will be able to adopt this technology if it's a well managed implementation project.

Clare Bottle FCILT is CEO of the UK Warehousing Association and Vice-Chair of Women in Logistics UK. Having joined the logistics industry in the 90s she has worked across a number of sectors including chemicals, construction and food & drink.

Before joining UKWA in 2021, Clare was Associate Director of Warehousing at Coca-Cola Europacific Partners. As head of UKWA, a leading trade association with over 900 members, Clare has pursued an agenda of economic, social and environmental sustainability, as well as driving diversity and inclusion.

Company: Amazon
Headquartered: Washington, US
Founded: 1994
Online: www.amazon.com

©Amazon

Will robotics be key to Amazon's same-day delivery success?

Company profile: Amazon

In the US the ecommerce behemoth is turning its hand to same-day delivery with smaller hyperlocal warehouses, while it shutters UK distribution centres for mega fulfilment sites

Amazon's Prime offering set the benchmark for next-day delivery, while also securing the former bookseller subscription-based income. But now Amazon is turning its attention to same-day delivery in the US.

"We're always exploring ways to bring our customers new levels of convenience and delivery options that work best for them. Same-day delivery is one of the latest innovations," an Amazon spokeswoman told the *Wall Street Journal.*

To ensure such speedy delivery, the ecommerce giant is focusing its US warehouse investment on "same-day site" warehouses. Recent reports suggest it has opened around 45 of its smaller warehouses in the last four years and could expand to at least 150.

These sites are primarily based near larger cities and deliver Amazon's most popular items. Amazon told the *WSJ* that new locations include Los Angeles, San Francisco and Phoenix.

It is a different picture in the UK, however, with multiple locations set to close, while two new mega fulfilment centres are in the works. Distribution centres in Hemel Hempstead, Doncaster and Gourock, in the west of Scotland, are to be shuttered, while a 2.325m sq ft facility in Peddimore and a 2.01m sq ft multi-storey warehouse in Stockton-on-Tees will go ahead.

This follows suggestions Amazon will also look to sublet UK warehouses it is currently not using. These unused big-box sites were snapped up during the pandemic in a bid to make the most of the ecommerce boom. Amazon has since recognised it was "building more capacity than we needed". Reports indicate Amazon will only sublet sites which it had taken on but has not moved into yet.

An Amazon spokesman, explained: "We're always evaluating our network to make sure it fits our business needs and improves the experience for our employees and customers. As part of that effort, we may close older sites, enhance existing facilities, or open new sites."

Company: Ocado Group
Headquartered: Hatfield, England
Founded: 2000
Online: www.ocado.com

©Ocado

As well as picking groceries, Ocado's bots constantly record data while on the grid. This equates to roughly 5,000 data points 1,000 times per second.

Company profile: Ocado

Automation is the key ingredient for this UK online grocer

Ocado's goal is to one day have warehouses completely run by robots, with no human interaction required. The online grocer's Customer Fulfilment Centres (CFCs) are highly automated to ensure large grocery orders get picked and packed in the fastest way possible, ready to go to customers.

CFC's operate on a system known as 'the hive', which resembles a giant robotic chessboard. The bots move around this grid, talking to the AI-powered 'air-traffic control' system 10 times per second. The system picks groceries from a stack up to 21 containers which sit below the grid. The containers are filled with some of the 50,000 products offered by Ocado, stored according to an algorithm that predicts when they will be needed.

Deploying AI to predict what products will be needed and when has previously enabled the online supermarket to have very low food waste. As low as 0.4%, compared to an industry average of up to 3%.

This may also come in increasingly helpful as Ocado faces falling sales due to the cost-of-living crisis. At the end of February 2023, Ocado Retail cited "the unwinding of the large basket shopping behaviours of the pandemic" for revenues falling 3.8pc to £2.2bn.

Ocado has since announced that it will aim to reduce the prices of up to 10,000 products to match competitor stores, as the on-going supermarket price war continues.

As well as trying to keep up with the value supermarket's price offerings, the online grocer is also working to match rapid delivery firms on speed of shipment. Zoom by Ocado, which initially launched in London and has recently expanded to Leeds, offers groceries in less than 60 minutes. Using a range of electric vehicles, including e-trikes and e-mopeds, the shopping will arrive in recyclable bags as the online supermarket continues to limit waste.

Zoom by Ocado once again places robotics at the heart of its operations. This rapid service sees all the ordered products picked and packed by the grid-riding robots, while humans will assemble the final orders before it is sent out for quick delivery.

Retailer interview: Wayfair

Jurrien Heynen, associate director UK warehousing at Wayfair

©Wayfair

Wayfair's 1,068,000 sq ft warehouse sits within the Logistics Golden Triangle to fulfil direct-to-consumers orders in the UK, Ireland, Germany, and Austria

As a homeware retailer, what are the warehousing challenges when selling everything from toothbrush holders to sofa beds?

For over two decades, our customers have come to Wayfair for all things home. We have gone from a two-person team working in a spare bedroom to a world-class organisation serving millions of customers around the globe. Today, we are home to more than 40 million products for any home need from over 20,000 suppliers worldwide. The sheer variety of products we handle means we must employ various handling and storage solutions to operate most efficiently. We have invested extensively both in manual handling training for our associates and in automated solutions such as vacuum lifters to ensure we can safely and efficiently handle the range of products stored at our UK warehouse in Lutterworth. The safety of our associates is our number one consideration at all times.

How has the site at Lutterworth helped you meet these challenges?

Our mission at Wayfair is to deliver perfect orders cost-effectively at scale. Our UK site at Magna Park in Lutterworth (1,068,000 sq ft and 20m high) has been fitted to support this achievement. This location is central to a wide range of fulfilment services for Wayfair's European business. At Lutterworth, we are fulfilling customer orders from the UK, but also for our customers in Ireland, Germany, and Austria.

Besides picking stock and providing cross-docking facilities for our supplier partners, we also process all customer returns for the UK at Lutterworth. Furthermore, we run a self-contained home delivery operation for local postcodes and complete various value-added services for our supplier partners at this site, including quality control checking and overpacking for protection and other multi-channel fulfilment solutions.

With 105,000 pallet locations and more than 50,000 other storage locations in our racking, plus 25,000 shelving slots for smaller items and a sortation system that can handle items up to 50kg and 2m long, our purpose-designed warehouse at Lutterworth is well set up to pursue our mission. Ensuring that our associates have a great and safe workplace is our other primary consideration, and the site has many features to help us achieve this as well.

What technology have you adopted in your UK warehouse? And does warehouse automation have the potential to speed up customer deliveries?

At our Lutterworth warehouse, we have deployed two sorters to enable the sortation of our outbound orders, which has helped us to dispatch more than 60% of our orders same day for next-day delivery, including larger items such as sofas, beds, and dining tables.

Not only does the sorter move the vast array of articles onto the delivery trucks, but the technology applied means that the process of ensuring the cartons get to the right truck at the right time is hugely simplified. As a result, it speeds up the whole process and enables us to get orders to our customers faster.

We have also deployed anti-collision technology on our picking trucks. At 12 tons each, they are large, sophisticated pieces of equipment and an essential addition to our operations to uphold our most priority: the safety of our employees.

How does Wayfair's warehouse operations support its sustainability goals?

At Wayfair, we are building our home with the future in mind. To us, this means helping to provide the feeling of home for those in our communities, developing a more inclusive workforce, and doing our part to protect our planet for future generations.

Through our Corporate Responsibility program, we address how our company impacts the planet and society. Also, in our warehouses, we continuously work on establishing various sustainability programs. These include efforts around energy efficiency, renewable energy, waste management, and sustainable packaging.

We are working to ensure our packaging is more sustainable while at the same time reducing product damage and return rates. In the last two years, we tested and deployed alternatives to conventional packaging material with more sustainable materials, such as paper bags, filling, and honeycomb paper in our UK warehouse.

We also share best practices with suppliers for damage prevention, minimising unnecessary materials, and utilising packaging that is both curbside recyclable and crafted from recycled content.

As part of our commitment to reducing waste across our supply chain, we donate thousands of pieces of furniture each year to local nonprofit organisations, such as Shelter, the leading charity working to tackle homelessness and housing issues in the UK. Not only does this help furnish homes for many families in need, but it also gives a second life to returned or excess products.

Our Lutterworth warehouse has the latest programmable LED lighting, allowing us to alter the lux and length of illumination time. We consistently review our sites to reduce our energy consumption further. Also, approximately 30% of the roof of our site in Lutterworth is fitted with clear panels during daylight hours. This vastly reduces the requirement for our LED lighting.

As another initiative, we have also upgraded our BMS (Building Management System), which allows us to closely monitor warehouse and office area temperatures and ensure that temperature regulation equipment, such as the large recirculation fans, only operates when required. In addition, we plan to have an electrical shunt unit for later in the year to reduce our CO2 emissions on site.

All of our UK sites have renewable electricity contracts in place. Solar panels also partially cover our UK warehouse, and we are continuously exploring opportunities to increase it further.

Company: Wayfair
Headquartered: Boston, Massachusetts
Founded: 2002
Online: www.wayfair.com

Wayfair's co-founders Niraj Shah and Steve Conine wanted to break away from the traditional home furniture retail offerings, which were constricted by the size of bricks-and-mortar stores.

Initially Shah and Conine looked at what people were searching for and built destinations for those products. Soon they had launched CSN Stores, a collection of more than 200 sites with everything from bar stools to bedroom furniture and birdhouses.

In 2011, they brought everything together under one roof and created wayfair.com: a single site where people could find millions of products for every part of their homes.

2023 and beyond

Growth in the warehouse sector is likely to continue for years to come. As UKWA's Clare Bottle explained - it is not simply an ecommerce related boom.

UKWA has also stressed how important the warehousing, and wider logistics, sector will be for the government's levelling up agenda. These sites have the power to create thousands, if not millions, of job opportunities across the UK.

As retailers adopt a hybrid approach of both physical and digital shopping models, it is likely the warehousing sector will do the same. There will always be a place for Big Sheds and MFCs.

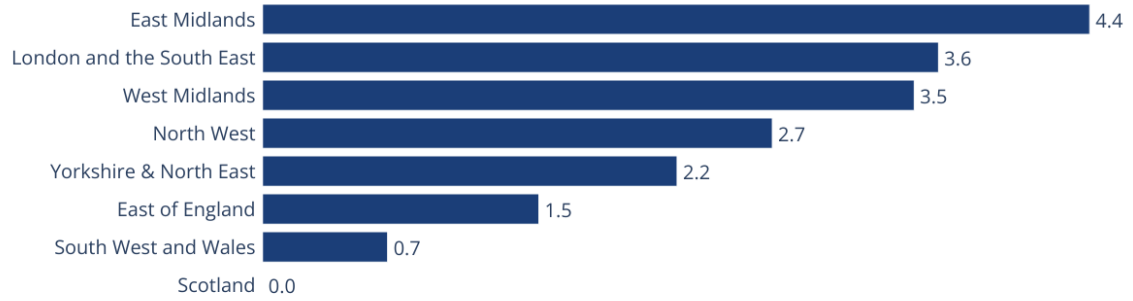
Whatever the size of the warehouse, it is clear that these facilities are going to be smarter, more efficient and sustainable. In having to accomodate a range of operations - no longer simply store stock, warehouses of the future will harness data and increasingly sophisticated technology to be many things to many retailers

While there are reports of companies regretting their investment in so many facilities - with Amazon looking to sublet unused sites - there are other companies looking to expand, to invest and to even improve existing sites.

It will be those companies who invest in their supply chain management, their warehouse space and their logistic operations which succeed in 2023, and beyond.

East Midlands is the region with the highest projected warehouse development pipeline

Development pipeline of industrial and logistic warehouses, UK 2022, by region (in million square feet)



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Conclusion

We hope you have found our research and analysis to be of interest and value. We would be very pleased to hear from you with questions, suggestions or comments. In particular, do let us know of any areas of research that you would like us to investigate for possible inclusion in the 2023 report.

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