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Retail & Robots: New Trends and Technologies are Upending Warehouse Real Estate

A report by the Propmodo Research team

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Retail and Robots: The New Face of the Warehouse Business

Authors:
Propmodo Research Team

Overview

While news stories like the rise and decline of WeWork or the retail realignment might cause observers to assume that the industrial world has been stable or even stagnant in comparison, the reality couldn't be farther from the truth. Many of the same factors that have influenced the broader real estate world, alongside some unique ones, are causing similar systemic changes to the industrial market.

The world of industrial real estate is highly exposed to traditional economic forces. Driven mostly by consumption, industrial is heavily impacted by consumer demand, unemployment rates and international trade policies. While commentators are currently concerned about the ongoing U.S.-China trade war as well as the in-progress novel coronavirus, the most recent specific cause for growth in industrial real estate can be traced back to the expansion of the Panama Canal in 2016. Now large enough to bring through ships twice the previous size limit, the United States is presented with new opportunities and challenges in storage and supply chain management along both coasts. Breaking from traditional logistic patterns, goods are arriving in new locations and need places to stay that did not before exist.

More than any other type of industrial property, warehouse space can be seen as the clearest example of a market in transition. In addition to all the traditional economic factors, this market is uniquely influenced by the shifting demands coming out of the real estate world, and in particular the increased global emphasis on eCommerce. This new type of selling continues to grow and as the retail industry experiments to find the best combination of brick and mortar shops, referred to as omni-retail, and delivery options including pick up points for online orders, the industrial real estate market must also evolve to support these initiatives. Once again, location is king.

This report takes a deep dive into the current trends and technologies impacting the warehouse market. Through in-depth research and

interviews with top industry experts, including people at Amazon, we move forward to survey the responses being undertaken by the warehouse industry in order to not only future-proof but set up for profitability well into the tech-enabled future. By providing not only a clear understanding of the warehouse business in 2020 but also an exploration of several notable case studies from operators like Amazon, Prologis and others, this report provides insights into the challenges and proposed solutions of last-mile delivery, the growth of fulfillment centers and how tech trends like robotics, drones and AI will mold the future.

What is driving change?

Before diving into the changing nature of industrial real estate, it's important to point out the fundamental demand drivers for warehouse space. Since these properties are concerned with the movement of goods to different end users in wide-ranging geographical areas, the market is exposed to a diverse array of impacts that function not only to stoke demand but also to mitigate it. Foremost amongst these is demand. Demand has several different impacts in this context. It spurs manufacturing and retail activity, which Deloitte mentions are the main drivers of industrial space demand. It also puts pressure on businesses to keep inventories up. These things in turn keep finished goods moving through warehouses on their way to consumers, and keep materials moving through warehouses towards the producers that will turn them into finished products.

The biggest factor: eCommerce & Last Mile

With the fundamental driver for warehouse space understood, it's time to consider the main reasons for change within the field. In 2020, the reality of the market is that eCommerce is the true change driver. There are indeed other factors which we will discuss later in this report, but

they are all at the very least influenced by the growing supremacy of eCommerce in the retail world.

eCommerce, typified by the kind of omnichannel marketing that provides customers with a similar shopping experience whether online or in-store, has shown strong expansion over the course of the last decade, with annual growth rates staying above 10% since 2010. That sustained growth has led to various effects and shifts throughout the entire supply chain, as well as specific, measurable impacts on the warehouse market. Recent research from CBRE found that "for each incremental $1 billion growth in e-commerce sales, an additional 1.25 million sq. ft. of distribution space is needed to support this growth."[1] This demand is not evenly spread throughout the country. While in past decades warehouse space has focused on cheaper rural areas with good access to transportation infrastructure such as harbors, rail or airports, high competition within the eCommerce business is pushing sellers to offer quicker, more convenient delivery.

55%

The percent of consumers who would switch to a different competitor if offered faster service

Source: Capgemini

By way of illustration, a consumer sentiment survey by Capgemini found that "Over half of consumers (55%) said that they will switch to a competitor if that competitor offers a faster service. Organizations that provide a superior last-mile experience will gain a competitive edge over their peers."[2] As last mile fulfillment has come to dominate the warehouse business, it has pushed warehouse demand into frequently more urban, smaller spaces where orders for a smaller geographical area can be rapidly fulfilled.

1 CBRE, How has e-commerce shaped industrial real estate demand? 2018
2 Capgemini, The last-mile delivery challenge, 2019

As part of our research, we spoke with Matt Powers, Executive Vice President of Retail and E-Commerce Distribution for JLL. Matt explained that "eCommerce has really turned [distribution centers] on its head. You can distribute from the rural centers but you can't fulfill. Distribute is for cases, fulfillment is for single items and you need to be in a more urban location. So it's pushed several retailers that can leverage an eCommerce platform to locate in those urban environments. It's really tightened up the markets."

Just what is the impact of eCommerce on industrial space?

As vast as the eCommerce business may be, it is still possible to gain a sense of the scale of its impact on industrial real estate. CBRE reports that "it is commonly thought that an eCommerce supply chain requires up to three times more warehouse and logistics space than a traditional brick-and-mortar supply chain. That outsized demand has had a profound impact on the market for space. Recent times have seen supply added via older spaces coming available as well as an addition of newer supply, and this has boosted vacancy rates. However, not all spaces are made the same. Warehouse tenants tend to want newer, higher-quality, higher clear height (typically 40') spaces to handle the volume of product they are now moving.

Nevertheless, demand has been so high for so long that some companies in search of space may choose to settle for lower-quality space. Matt added that "I think developers are building to that higher clear height to facilitate the future growth, however the demand is so high that it's not necessarily a driver for some companies. They're willing to take a less than ideal, maybe a functionally obsolete building, just to have a presence to a population base."

It's all about location

The growth of eCommerce, particularly in urban areas, has led to various interactions with supply and demand, and other economic factors, at various scales. Land economics is one of the principle examples of this. Given the aforementioned nationwide trends of supply and demand, it's generally hard enough for owners to find space around the country. And as eCommerce players and logistics giants compete for space in denser urban areas, where more customer orders can be easily fulfilled, finding space for new warehouse space has become increasingly difficult.

There are other realities to the search for a good location, as well. Rising transportation costs also have a strong impact on location decisions, as do labor dynamics. With U.S. unemployment hovering around 3.5%, joblessness is at its lowest in over half a century. While this is good for job seekers, it is as much a challenge for retailers and distributors as it is for the construction sector: according to research from Capgemini, "43% of executives said that a contracting labor market – coupled with inflationary wage pressures – is a major challenge for implementing last-mile delivery solutions."[3]

How important is trade?

Finally, the last major factor determining warehouse trends is the nature of global trade. While the impacts of individual dyadic relationships within international trade shouldn't be overestimated, the trade policies of different countries nevertheless play an important role in determining warehouse demand and leasing activity. The current U.S.-China trade war is one example. CBRE points out that while the U.S. has more trade partners than just China, an ongoing conflict between the two countries could impact consumer spending as well as potentially divert import activity from China to other Asian countries.

3 Capgemini, The last-mile delivery challenge, 2019

An interview with Brian Wright, CEO of Chunker

Chunker is a listing platform that allows space users to find warehouses for short-term use. We asked Brian Wright, Chunker's CEO, a few questions about his business and the nature of the industrial PropTech scene.

What has surprised you most about the warehouse market from what you have seen on the platform?

When we started Chunker we had a specific use case in mind, and a specific audience. Both of those turned out to be right on, but the most surprising thing we have learned since we entered the market is how many other use cases there are, and how many different audiences there are. We see new things every day.

One specific use case that never crossed our minds was the filming of movies, but our very first deal was for a company who wanted to shoot a commercial, and we have had a fair number of other requests for movie-type deals.

How do you think that flexible options like yours are changing the industry?

Historically the industrial real estate market has been very slow and cumbersome to deal with. Couple that with the long-term leases that companies were effectively forced into and you had a situation that made it very hard for companies to be agile and respond rapidly to changing market conditions.

Imagine wanting to try out a new market and being faced with a massive lease payment for 5-10 years just to do a trial run to see if it would work. That would put a big damper on your plans because it increased the risk and complexity of that market trial so much.

Now imagine the same scenario where you could go to any market, do a short-term deal for 6 months, and then assess the results with total freedom. It is easy to see how a flexible solution can dramatically increase a company's options and open many new doors for them.

Who have been the early adopters of the platform and what seems to be the types of spaces that are the most commonly listed and why?
Because we have created a two-sided marketplace, we have two sets of early adopters, one for the space side and one for the demand side. On the space side, 3PLs and small to medium sized landlords have been the first to jump on and list their space. A typical listing right now is about 25,000 square feet of primarily open warehouse space. It varies a lot of course, but we see a lot of that type of listing.

On the demand side the actual type of customer has been all over the board, but in many cases the use of the space is for some type of immediate storage needs or kind of project based.

What have been some of the barriers to adoption of this kind of a solution and how are you addressing them?
Our biggest barrier to adoption is just getting the word out because we are a relatively small fish in a gigantic pond. The primary way to overcome that obstacle is a lot of advertising coupled with building word of mouth communication channels to help us extend our reach.

Once we make contact it is very easy to explain what we do and why, but in order for a warehouse owner or tenant to want to list their space we still have to overcome a variety of objections. Almost all of the objections are a result of the space owner trying to put a square peg in a round hole because they are trying to compare our model to how they have always done a real estate deal, and they truly don't understand the new ways that things can be done in a sharing economy.

Our strategy to overcoming those types of square peg-round hole dilemmas is to spend time upfront methodically educating the customer so that they understand all of the benefits of maximizing revenue on their warehouse. Once they get it, they see how easy and obvious it is and are excited to jump in.

What economic and societal trends are changing the warehouse industry and how are they affecting it?
There are a few significant trends that really help pave the way for us. The first is that more and more, people are getting used to sharing everything, from wedding dresses to rooms in someone else's house. Not only is this because of the giants like Uber and Airbnb but is also because everything has gotten more expensive. Nobody at any level can really afford to have ex-

pensive things sitting around and not being used. This is especially true of a business with very capital-intensive assets like warehouses.

Another thing happening in society in general and very specifically in business is that the world is becoming hypercompetitive. This is forcing companies to make sure that every asset is operating at peak capacity and generating as much income as possible. Or, on the flip side of that, that every expense is minimized so that overall profit can be maximized.

A direct result of our hypercompetitive world is the need to be agile and to be able to respond to competition quickly. Being able to respond very quickly to changing market demands or customer demands allows a company to compete more fiercely and to generate more profit.

All of this ties back to the first trend, which is sharing, because now a company doesn't need to spend years building new buildings or even a year or more trying to lease one just to add inventory, go after a new customer segment, or try a new market. By sharing they use their capital much more efficiently while being able to get a building the next day, which is a game changer on both accounts.

What are top landlords doing now that you think will be standard practice in the near future?

The best ones are listening intently to their tenants and focusing on doing things that are responsive to their needs. This will build long-term relationships which will lead to better profitability. The solutions and innovations they will come up with as they work with their tenants will take many forms, but they will all help to make their relationships longer.

Another thing that the top landlords are doing is embracing technology solutions to help streamline and automate their operations as much as possible. This can also take many forms, but it will make the tenant experience much better and the landlord more profitable.

Responses to Change

With this diverse variety of factors influencing the warehouse world, how are owners and operators responding to change? Broadly speaking, we are seeing three categories of adaptation coming from owners and space users right now. These are warehousing-as-a-service, innovative property reuse strategies, and technology adoption.

Warehousing-as-a-service

In the wider real estate world, space-as-a-service has been one of the most transformative trends to emerge of the last half decade or so. On the residential side, this manifests primarily as co-living, the style of long-term rental accommodation where multiple individual renters share some degree of common area space, whether that is a kitchen, living room, or even bathrooms. For office space, co-working has dominated industry headlines in recent months. On the retail side, companies that provide pop-up space on demand, like Storefront, fulfill this niche.

For industrial real estate, space-as-a-service means warehousing-as-a-service. In many ways, this is an evolution of the longer-term trend towards the use of Third-Party Logistics (3PL) providers. 3PL companies offer to take over some portion of a client company's logistics operations, whether that means warehousing, delivery or all of the above. The 3PL business has itself been booming in recent years. In the first half of 2018, 3PL companies were the biggest driver of industrial leasing, beating out even eCommerce, for the first time.[4]

For its part, warehousing-as-a-service can be difficult to distinguish from 3PL. Ben Munn, JLL's Managing Director for Flex Space, compared trends toward service in the business to the rise of the data center

4 NREI, Third-party logistics providers drive industrial leasing activity in first half of 2018, 2018

property type, and characterized it with the mindset that "I'm only going to pay for what I need." While warehousing-as-a-service is also notable for its generally technology-mediated access, this is the critical differentiator that defines the term: the ability for space users to reserve warehouse space for very short timeframes if need be.

In fact, some of the most prominent users of warehousing-as-a-service platforms are themselves 3PLs. This makes sense: since 3PLs occupy space on behalf of clients, being able to rapidly scale up or down is critical to ensuring adaptability and responsiveness to client needs.

Repurposing buildings

Another avenue industrial owners and operators are taking to increase their property options is repurposing buildings. Giving old spaces a new lease on life, with a much different purpose, can serve a public good (by helping functionally obsolete buildings achieve their highest and best use) while allowing industrial players to acquire useful properties at a lower cost. Consider Amazon's experience in Baltimore, where the company's Sparrows Point distribution center, with almost a million square feet of space, occupies property previously used by GM as well as Bethlehem Steel as a shipyard. These properties may not have been originally built with warehouse use in mind, but that is how they now serve.

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The number of retail-to-industrial conversion projects throughout the U.S. as of early 2019

Source: CBRE

There is also a supply-side reason for this sort of redevelopment project. As more and more malls are affected by the retail realignment, many of

these spaces find themselves searching for new, resilient ways of keeping the lights on. While some double down on retail by cultivating experiential opportunities and interactivity, others have gone another route, favoring industrial uses such as warehouse space. As of January 30, 2019, CBRE identified 24 distinct projects initiated since 2016 that aimed to convert retail properties to industrial use.[5] Here, too, Amazon stands out, having taken mall space in Ohio and elsewhere.

However, some caution is due when looking at conversion projects like these. Omar Eltorai, Market Analyst at Reonomy, told us that "there are many factors that could pose a challenge to this becoming a broad trend, such as zoning or conversion costs. I have a tough time seeing, and this may be an extreme example, all dead malls turning into industrial properties."

At the same time, industrial spaces themselves are also undergoing conversion to other use types. Greg Kraut, Co-Founder and CEO of K Property Group, a real estate private equity firm, told us that "most of the industrial spaces in Manhattan have already been converted to office. In the boroughs, they are being converted to more advanced industrial, creative office, and in some cases residential/hotel."

Technology

The final broad category of responses is technological adaptation. Within this category, we see four broad groups of responses: robotics and AI, data, sensors and energy efficiency.

Robotics and AI are exerting a transformative impact across real estate property types and job functions. The World Economic Forum refers to these technologies as the "Fourth Industrial Revolution," explaining that "in 2018, in terms of total working hours, no work task was yet estimated

5 CBRE, Once implausible, conversions of retail real estate to warehouses emerging across US, 2019

to be predominantly performed by a machine or an algorithm. By 2022, this picture is projected to have somewhat changed, with machines and algorithms on average increasing their contribution to specific tasks by 57%."[6]

Within warehouses, robotic systems and AI fulfill many roles, often related to spatial efficiency. Ocado, an online grocery company based in the United Kingdom, uses algorithms to organize goods, and wheeled robots to move them to and fro. The robots are controlled by an AI "hive mind" that organizes individual bots to quickly and efficiently accomplish their goals.

In the future, these technologies will exert an even more impressive influence on the warehouse world. Alongside self-driving cars, drone delivery is on the cusp of acceptance, with individual manufacturers (such as Ben & Jerry's) as well as hospitals, delivery companies and others getting into the game. UPS and FedEx are both testing options; in UPS's case, drones will be used to ferry supplies and material between hospitals.

Data is also a crucial component for modern warehouse operators. Not only does it help target investment capital as in other real estate markets, data also has uses within warehouses themselves, in particular in order to power the AI systems like those of Ocado. Deloitte explains that "owners can now leverage newer data sources and analytics techniques to make smarter location decisions. They could combine information about traditional factors with geocoded data points on regional online sales, consumer lifestyle and behavior, and traffic movement. Then, they could use analytics to understand the impact on the warehouse market and build algorithms to predict alternative future scenarios."[7]

While some data comes from market sources, at other times data can be gathered on the fly. This is where sensors fit in. By empowering those

6 World Economic Forum, The future of jobs 2018, 2018
7 Deloitte, The future of the industrial real estate market, 2019

systems of robotics, data and AI with a steady stream of new information, sensors allow warehouses to continually optimize for changing conditions, such as inventory shifts.

Finally, improvements to energy efficiency can largely be attributed to tech advancements. Warehouses are unique amongst property types since in many cases, not only the building itself but also the logistical equipment (or robots) within can be optimized for lower energy use. In addition, regulatory agencies like New York's NYSERDA offer wide-ranging benefits for property owners that increase the efficiency of their properties. This provides a particularly significant opportunity for warehouse owners and users to cut costs.

Who is responsible for energy efficiency?

Anecdotally, owners we have spoken with will often devise long-term savings sharing agreements that allow energy efficiency improvement costs to be split with tenants. Anthony Rozic, CEO of industrial property company Goodman North America, told Propmodo that "customers typically take operational responsibility, however, building features are usually tailored to the needs of the customer. At a minimum, we provide the infrastructure within the building to maximize energy efficiency and space utilization. That means solar-ready roof systems, sensor controlled LED lights, and similar implementations."

For owners, addressing these technological goals isn't just a simple matter of signing contracts with PropTech providers. According to Deloitte, "More than 30 percent of US warehouse buildings are over 50 years old and the average age of all warehouse properties is 34."[8] Useful tech tools consequently require buildings to be made ready for proper implementation. That can often mean ensuring reliable access to both power and connectivity throughout the building.

8 Deloitte, The future of the industrial real estate market, 2019

Interestingly, consensus about tech investment for this niche is mixed. According to a 2019 survey of industry professionals by Modern Materials Handling magazine, "Those taking a "wait-and-see" approach on materials handling investments and related technologies was at 34% this year, up from 29% last year."[9]

Case studies in warehouse transformation

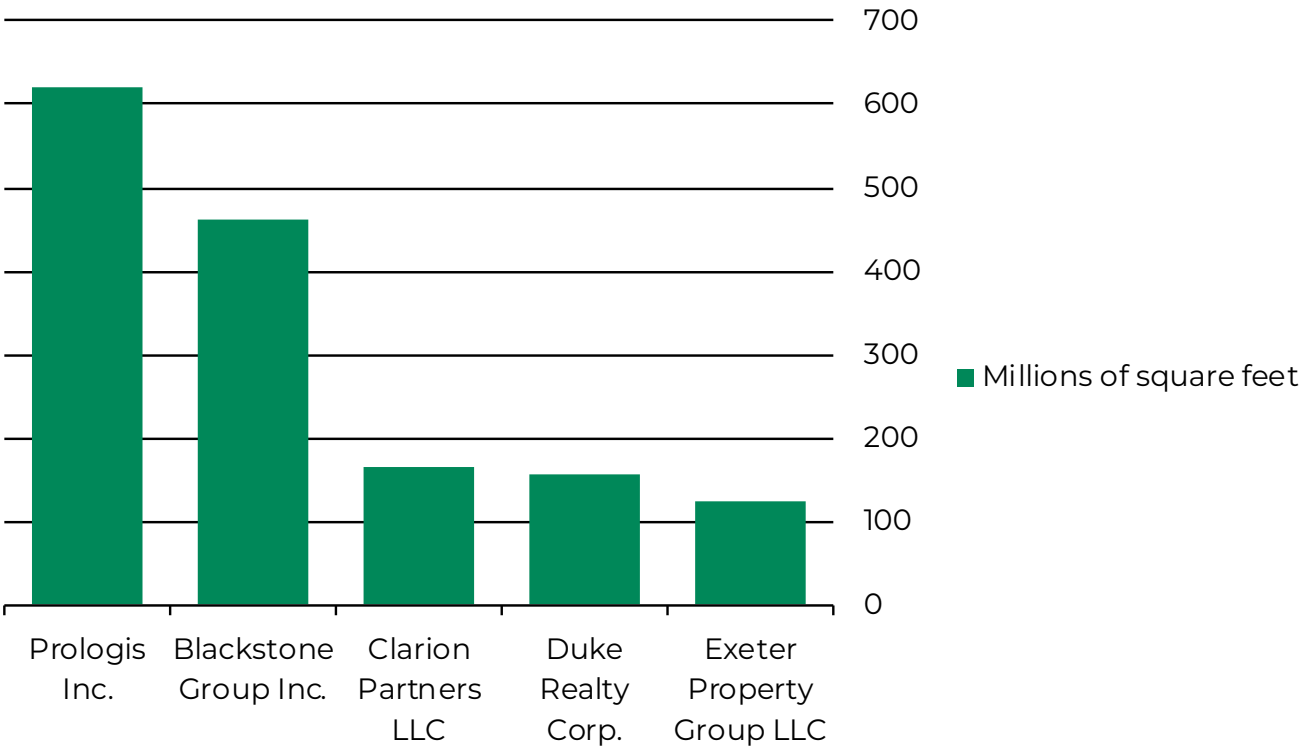
To conclude, we present several case studies of warehouse transformation. These companies, Amazon, Prologis and Blackstone, have dominated much of the conversation around industrial space in recent years.

Amazon has found itself at the center of a wide range of real estate stories in recent times. Between the HQ2 office search process and resulting backlash from New York City, the company's previously-mentioned transformative approach to warehouse space and utilizing underused spaces, and the company's devastating effect on retail (as well as its subsequent expansion into retail itself), there seems to be little within real estate that Amazon has not touched. Interestingly, despite the company's eCommerce dominance, Amazon is a long way from having a retail monopoly: the New York Times says that the company "accounts for 40 to 50 percent of online retail in the United States — but that is only four to five percent of total retail."[10]

The challenge for well-funded, nationwide companies like Amazon goes back to urban delivery. The marginal value of a new warehouse out in the hinterland for a company such as Amazon is negligible; on the other hand, the addition of distribution capability near major population centers, and consequently big consumer bases, is worth gold. With that in mind, Amazon's strategy has been to do more with less. The company's

9 Modern Materials Handling, 2019 MMH warehouse/DC equipment survey: Still bullish, but more measured, 2019
10 The New York Times, Prime mover: How Amazon wove itself into the life of an American city, 2019

Just how much space are Blackstone and Prologis taking?



Source: CBRE as of late September 2019; including pending transactions

New York City fulfillment center, for instance, is 20% smaller than its typical center but leverages additional robotics as well as off-site presorting to increase space efficiency by 50% over a typical Amazon center.

Amazon is quick to claim that its increasingly-robotic workforce does not kill jobs. Their company blog states, "It's not humans vs. robots, it's humans + robots," before going on to explain that "Amazon runs 175 fulfillment centers worldwide. In 26 of them, robots and people work together to pick, sort, transport, and stow packages. While it's true robotic automation has taken over certain duties, such as carrying pods of inventory and transporting pallets through buildings, it's making the lives of associates easier by performing the less desirable, more tedious tasks."[11]

11 Amazon, What robots do (and don't do) at Amazon fulfillment centers

The World Economic Forum seems to agree with Amazon's sentiment. While explaining that "even those work tasks that have thus far remained overwhelmingly human—communicating and interacting (23% [of total task hours done by machine]); coordinating, developing, managing and advising (20%); as well as reasoning and decision-making (18%)—will begin to be automated (30%, 29%, and 27% respectively), the WEF goes further to say that emergent job roles will offset this change: "One set of estimates indicates that 75 million jobs may be displaced by a shift in the division of labour between humans and machines, while 133 million new roles may emerge that are more adapted to the new division of labour between humans, machines and algorithms." [12]According to the WEF, many of these jobs will be in fields like data science but others will be in areas like sales and customer service that are highly resistant to automation. It's important to note that while it is fair to expect new jobs across the country, not many of these are likely to show up for the warehouse business. Growth in customer service roles may not be able to change the employment losses brought on by better and better self-driving cars and more effective automated warehouse robots.

Where does that leave Prologis and Blackstone? These two companies are responsible for $38 billion of warehouse acquisitions over the course of 2019, giving them a combined total of 1.1 billion square feet of warehouse space, more than the next 14 owners combined. [13]

The strategy being used by both Prologis and Blackstone is one that might be more familiar to followers of traditional M&A activity: combining the portfolios of multiple companies under their own banners. Prologis recently acquired Liberty Property Trust's industrial space for $13 billion. Blackstone has taken warehouse space from GLP, PIRET, Colony Capital and others. The company's purchases have gone far enough that Blackstone recently launched Mileway, a last mile logistics company that operates over 1,000 properties.

12 World Economic Forum, The future of jobs 2018, 2018
13 CBRE

What's next?

This report has dived into the trends and advancements that are defining the warehouse world. The future of warehouses is dynamic, influenced by some long-standing factors as well as emergent ones brought on by competition and technology.

We expect to see a few trends continue to develop in the near future. First of all, the importance of last mile logistics is unlikely to change. As consumers continue to demand faster and faster service, warehouse owners will feel pressure to provide space in the most competitive, in-demand areas of big cities. At the same time, residents of suburbs will demand the same level of service. It's these much larger spaces that could represent the bigger investment challenge for owners.

Additionally, technology will continue to mature, and with it even more jobs and operations will be affected. Amazon and the WEF may tout the harmony between man and machine for now, but as AI develops and entire operations begin to be streamlined, many logistics workers will likely find themselves out of a job. This will represent a management challenge as warehouse operators compete to embrace the most cutting-edge tech and unload costly workers, while trying to avoid the reputational harm that such a dubious honor will undoubtedly provide.

Finally, we expect to see an increase in the utilization of warehousing-as-a-service. Not only for 3PLs and companies with dynamic space needs (such as film production houses), but also for rapidly growing companies and businesses hoping to gain a foothold in new markets. On the same note, innovative approaches to reusing space can help provide warehouse facilities for companies as well as unique mixes of R&D, office and retail space as well.

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