

The Warehouse of the Future

How Employment Challenges are shaping the Evolution of the Warehouse



High architectural value of Levi's Distribution Centre

© Delta Developments



The employee is an essential component in workplace processes in and around warehouses.

The humble warehouse used to be a very straightforward box, but it has been evolving due to various reasons, such as new sustainability requirements and the need to attract staff.

In some geographies, such as North America, it is so difficult to attract and retain staff to work in the logistics sector that it has changed the way warehouses are being designed and built and how operators interact with their employees and surrounding communities.

Some parties are focusing on developing and operating new warehouses with a focus on human wellbeing. Common approaches include adding specific staff facilities, such as relaxation rooms, outdoor picnic areas or even daycare facilities.

Another is making the building more comfortable for staff through the addition of windows, air conditioning and improving the facades' insulation performance.

Less building-focused approaches include subsidised or free meals and snacks, events and training opportunities.

In general, these are however still not a focus area for most developers or operators. A focus on sustainability, nature-inclusivity and environmental, social and governance (ESG)-goals, which allow the employee to benefit from as a second order effect, seem to be more common.

Certifications can help provide standards for employee wellbeing. Green building certification systems, such as LEED and BREEAM, seem to be more popular and allow staff to benefit indirectly as described above.

The WELL Building Standard supports the health and wellbeing of employees, but is more focused on office workers.

The investment of a developer or future warehouse tenant in a healthy building is expected to provide a return on investment through healthier, happier staff that provide enhanced performance.

Many warehouse employees still prioritise pay and commuting distance when choosing where to work, but are also open to other aspects when selecting their employer.



These range from how the company brands itself to subsidised lunches to a work culture that emphasises the staff's career, rather than their job, through training opportunities for example.

Automation of manual labour in most warehouses has not led to a reduction of staff.

Employees have mostly become more productive through the help of automation: robots bring the goods to them, instead of staff having to walk around; and robots provide efficient picking orders and routing, doubling the number of orders an employee can pick.

But different types of employees are now seen in the warehouse. For example, more technically skilled staff are needed to maintain the automation machinery. A third of people working in logistics are now higher educated.

Simultaneously, a broader range of society can participate in the work process as automation and digitisation have made certain roles more accessible, generating more equal opportunities in warehouse jobs.

Lastly, automation may also have led to harder jobs. Due to routing efficiency gains, an order picker is walking less and lifting more loads per hour. And some of the positions that were not able to be eliminated through automation might have become too tedious and soporific.

Some demographic trends are also resulting in new solutions. Aging of the general population in some regions and therefore workforce population leads to an increasing average age on the work floor.

The use of automation or mechanisation can remove many of the physical constraints of some warehouse jobs, allowing operators to hire an older workforce or people with disabilities.

Rhenus Distribution Centre Tilburg
A green and bright interior.

So what can everyone do to create warehousing environments that are more attractive for employees to work and stay, and buildings that integrate better into their local environment and neighbourhoods?

Industrial real-estate developers

can work with architects and contractors to find ways to keep sustainable, nature-inclusive, human-centred warehouses as affordable as regular big boxes. At the very least it should become the norm for long-term focused clients, such as pension funds and luxury brands to take the extra step. Developers should aim to develop logistics parks that allow space for safe cycling infrastructure, transit facilities, greenery and quality spaces that can allow for a lunchbreak escape from work.

Warehouse operators

can select the buildings and logistics parks that meet the aforementioned human-focused qualities. Beyond that they can support their staff by going beyond a good pay and providing amenities or benefits, as well as a work culture that communicates appreciation and opportunities for growth, which will support retention.

Municipalities

also have an important role to play. They can dictate certain qualities of the public realm in a logistics park, such as safe and equal accessibility, aesthetics and climate resilience, and plan for logistics facilities in or near urban areas. Perhaps even more important, they can issue (temporary) environmental permits that allow for other uses in industrial or logistics zones, such as residences for labour migrants or a daycare facility that can be supported by multiple warehouse tenants.



The future of the warehouse may be bright.

It will not look like a typical big box anymore, but will have aesthetical qualities, blend in with its landscape and have green facilities that support biodiversity and climate adaptation.

It will contribute to generating part of its own energy demand, or even export energy to neighbouring buildings, and its design will benefit the humans working inside through amenities and physical attributes that make for a pleasant working environment.

Its tenants will actively be engaging with the community to ensure mutual understanding of their needs and prepare the next generation of warehouse employees.

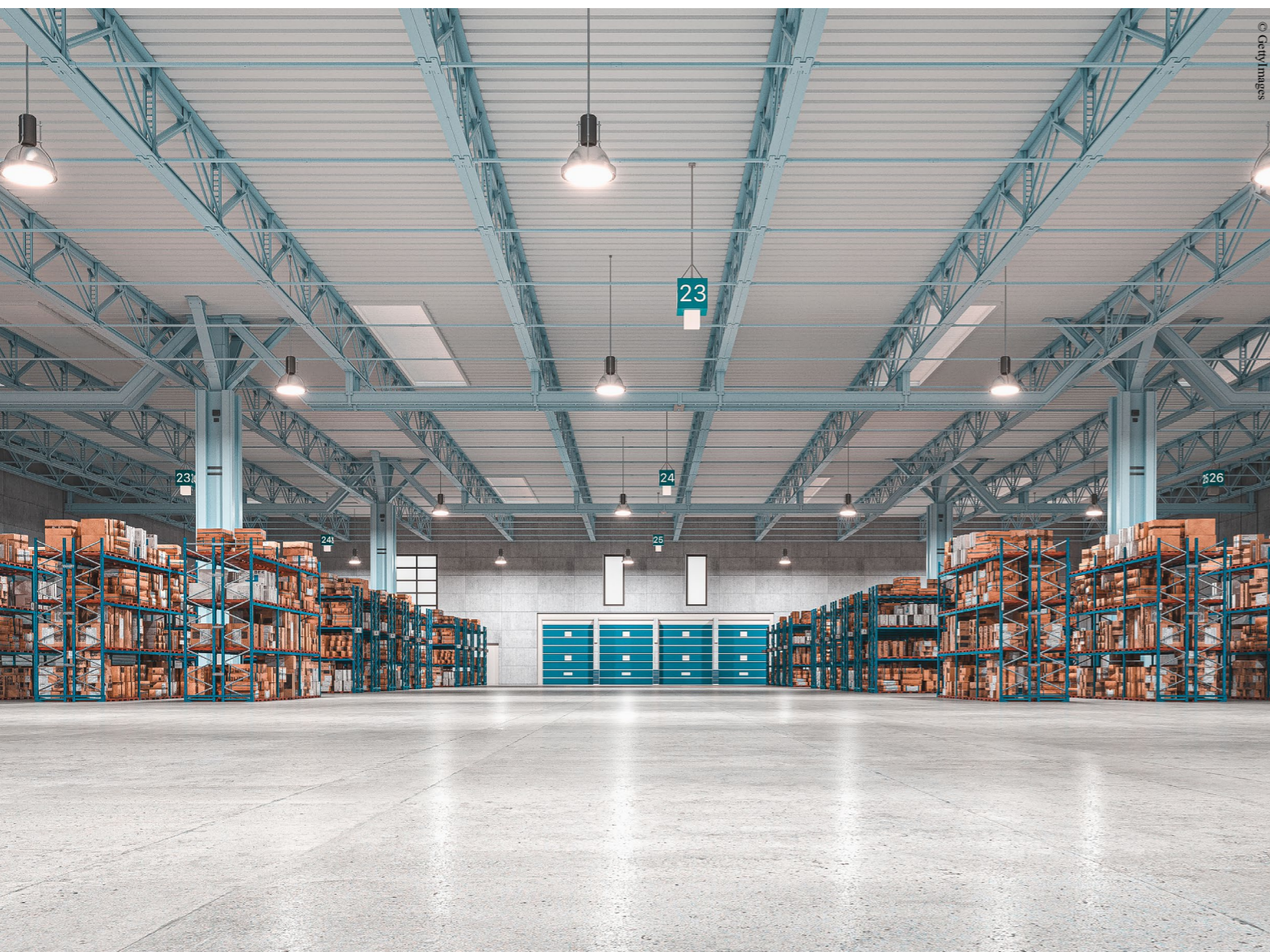
Top to bottom

Rhenus Distribution Centre Tilburg;
Goodman house; KaFra Tower Zevenbergen.

Introduction

Traditional warehouses are typically characterised by a large, open floor layout that aims to maximise storage capacity and ensure the safe and efficient storage and movement of goods. These warehouses would be constructed using metal and concrete with minimal windows to prioritise functionality over aesthetics and minimise costs.

Traditional warehouse
Corrugated steel wall
of warehouse building.



Industrial warehouse
Interior, little natural lighting.

Introduction

Manual labour is at the forefront of traditional warehouse operations, with employees being responsible for inventory management, receiving incoming shipments, quality control, order picking, packing, and shipping.

However, with such a focus on maximising efficiency in warehouse design, employee wants and needs are often overlooked which has caused difficulties attracting and retaining staff for warehouse operatives.

The research undertaken by Arup aims to understand whether labour shortages within the warehousing and logistics sector are common across the world, having noticed organisations within the United States of America (USA or U.S.), specifically New Jersey, struggling to attract and retain employees.

Providing that the issue of employee attraction and retention is consistent with organisations across the world, this paper investigates the intricate relationship between modern warehouses, automated technologies, and employment.

It seeks to understand the strategies used for mitigating labour shortages in this evolving landscape, such as the impact of automation, warehouse design and employee amenities.

The five key research objectives are listed below:

- **Investigate** the types and volume of jobs created by modern warehousing.
- **Analyse** existing metrics to understand how warehouse space translates into job generation.
- **Predict** future trends in warehouse automation.
- **Investigate** facility design, employee amenities, and other measures taken to attract and retain warehouse staff.
- **Explore** strategies employed by operators to address labour shortages and high turnover in warehouses.

Given the nature of the work carried out within warehouses, a sufficient and productive labour force is crucial to ensure successful operations^[1], and so, this research aims to provide the reader with a detailed overview of the methods organisations across the globe are using to tackle this issue.

[1] Liefer, "How to maximise manual labour productivity in warehouse operations," Journal of Supply Chain Management, Logistics and Procurement, vol. 5, no. 4, pp. 313-324, 2023.

Research Methodology

The research methodology consisted of three main parts: a literature review, stakeholder interviews, and data analysis with all research based on information from Europe, Australia, Hong Kong and the USA.

Levi's Distribution
Centre Dorsten
Interior with lots of daylight.

The Warehouse of the Future

Research Methodology

Desktop Research

An extensive review of industry reports, academic publications, press releases, and relevant online sources including, but not limited to, The Wall Street Journal, Business Insider, The Industrialist, DC Velocity, and Logistic Management. Preliminary research focused on identifying top developers and operators in the warehouse industry and finding examples of modern warehouse projects across different regions of the world.

Further investigation was conducted to gather baseline information on the types of jobs created by modern warehousing, industry employment figures, and existing trends around automation and employment.

Stakeholder interviews

Three categories of stakeholders were identified that would help shape the research: real-estate developers, warehouse operators, and warehouse & logistics associations.

In addition to the focus on these three categories, an architect and an employment agent were interviewed to give alternative perspectives on this research.

A full list of interviewed stakeholders and organisations can be found on the Acknowledgements page.

Once relevant organisations were identified, interviews were conducted to gain insights into the specific job types associated with warehouse development and automation, perspectives on the importance of staff attraction and retention, and expected future trends.

Within the targeted organisations, the interview process covered four regions across the globe including North America, Europe, Australasia, and Asia.

The global trends identified in this document are limited to the insights shared in the 12 interviews conducted.

Once the literature review and stakeholder interviews were completed, output was closely examined to search for recurring patterns, significant meanings, and underlying themes within the research.

This systematic approach allowed initial desktop research to either be validated by or contradicted by the perspectives of interview participants, and meant all findings were rigorous and thorough.

The analysis revealed key themes including employment, warehouse design and amenities, automation, and miscellaneous viewpoints.

The key findings in this report are categorised by these overarching themes.



Levi's Distribution Centre Dorsten

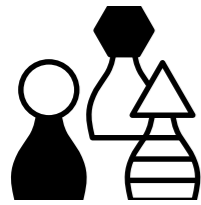
Interior with wide hallways.

Key Findings

Labour shortages are changing the way warehouse development and operations occur, but the relationship between the two is still developing.



Levi's Distribution
Centre Dorsten
High architectural value.



Employment

General Trend

The demand for labour in the warehouse and logistics industry soared after COVID-19 due to the rapid increase of e-commerce and a growing dependence on online retail.

This was coupled with a general heightened recognition of logistics as a market, service, and business component. Many companies in the warehouse and logistics industry are struggling to attract and retain employees to meet today's demand. Even some of the leading organisations in the industry are experiencing up to a 40% turnover rate.

The number of UK businesses in the transport and storage industry has grown by 88% from 2011 to 2021 and 21% since 2019. However, the rate of growth in new business has been faster than the rate of job creation in the sector, with employment being just 20% higher in 2021 than it was in 2011^[2]. As the footprint of warehousing and logistics real estate continues to grow and expand, finding the right labour will remain a primary focus.

40%

turnover rate for some leading organisations.

88%

number of UK businesses in transport and storage industry has grown by.

[2] (2022, April 11). The rise of the UK warehouse and the "golden logistics triangle". Office for National Statistics. <https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/articles/theriseoftheukwarehouseandthegoldenlogisticstriangle/2022-04-11>



A key challenge in warehouses today is high labour attrition due to monotonous tasks, lack of skilled workforce that can adapt to changing environments, and increased labour costs.

It is hard to find available labour, and even harder to find good quality labour. In recent years in Australia, it has been observed that the quality and experience of labour has declined in this region, especially after COVID-19.

Within the Asian markets, certain countries, such as Vietnam and Indonesia, still manage to attract labour, however, in general, the shortage of labour is observed across various job levels, ranging from working level to supervisors and management roles. Interviews with experts across regions have similarly highlighted the difficulty of navigating the workforce post-pandemic.

Additionally, the cost of manpower in the U.S. has increased more than 40% over the past 2 – 3 years. Location is another factor of which can either help or hinder the ability to attract employees. Some areas have a much higher competition which increase the difficulty to tap into the labour pool.

Warehouses located in areas with more challenging labour markets or less desirable areas will require a stronger employee value proposition to help get people in the door. Interviews with a few industry professionals have shown light on how labour shortages are impacting companies in different regions, and considerations to help address these challenges.

Warehouse employees
OTTO Work Force.

Key Findings: Employment

Employment Metrics

Part of this research initiative explored whether employment metrics are being used to estimate the number of jobs generated by warehouse space. Through desktop research, some publications in the U.S. suggest assigning a utilisation rate of 1,000 - 1,500 square feet per warehouse job, however, there is no one standard guideline that can be applied across all warehouses^[3].

Ultimately, the volume of required staff is dependent on various other factors such as type of products, level of automation, and workflows.

Methods for estimating employment can also vary based on the organisation's strategy, size, and productivity.

General insights from industry experts state that employment numbers will fluctuate by volume, rather than warehouse space. Often in the U.S., a productivity factor is assigned for each warehouse job, and that determines the number of workers needed to meet a certain demand. Similarly in the UK and Ireland, employment estimation is based less on warehouse size but uses a methodology that compares all types of operations and activities.



Warehouse employees

OTTO Work Force.

[3] "Measuring Employment" Metro Council Local Planning Handbook, November 2016

This methodology examines if sites are below the productivity level and identifies the number of employees needed. For example, a pick, pack, and dispatch operation will require a much different headcount than an engraving operation due to the level of detail and time required to complete the task.

Insights from Australia provide a similar methodology which uses the estimated time required to complete an order, coupled with the volume of orders per day, to calculate how many operators and/or pickers will be needed.

Although these methods can give an estimation for required labour, generating consistent and accurate forecasts in a changing market remains a difficult task for organisations everywhere.

Data can be hard to find and is not easily shared due to high competition. Challenges to predict future demand adds another layer of complexity for companies navigating today's labour market.

Types of Employment

Due to labour shortages, warehouses are focusing on attracting and retaining staff more than ever. The average age of the population and therefore the workforce is increasing in most western countries.

In The Netherlands and Germany, for example, employers have been seeking Polish labour migrants to support the logistics sector, but in Poland, the average age is even higher and they are looking for labour migrants from Asia to come and help out.

Warehouse staff now consists of two "populations": the lower-wage order fulfillers and the highly educated employees that maintain the robotics, etc. Both are hard to come by.

Research confirms that this trend is affecting every region, however, conversations with industry experts reveal that organisations can be impacted differently based on employment structure, level of automation and technology, and company goals.

"Warehouse Management and Supervision positions are the hardest; they are the ones that are typically grown in the same warehouse but never had their management skills honed."

Andrew Oliver, Expeditors

Some organisations in the UK, Europe, and Australasia experience more difficulty attracting and retaining higher-educated staff, while some U.S. organisations observe that lower-salaried workers are harder to come by. Within the Asian markets, shortage of labour is generally observed across various job levels, ranging from working level to supervisors and management roles.

The logistics sector is requiring more highly skilled technical experts but is struggling to attract people into the industry.

In the UK and Ireland, some organisations have supervisors on site that are trained specifically to use the technology installed. In addition, there is a centralised solutions and technology team that holds a more holistic view of the business and can help implement, facilitate, and manage new technology at the site.

These facilities find it most difficult to attract white-collar workers, IT, and technology solutions roles. In turn, they put an effort towards developing a variety of internal programs focused on attracting and retaining talent such as graduate schemes.

In Australia, sometimes the hardest positions to fill are the managers and supervisors. Often, employees are placed in management roles without receiving adequate managerial training. As an example, Lululemon have been addressing this gap by hiring managers from different professions that do not have retail store management experience but have the right attitude and leadership skills.

A prominent trend for warehouses in the U.S. is that there is more of a shortage of frontline, lower-income workers. The challenge to accurately forecast demand for required staff can cause a high turnover rate. Due to this, some 3PLs are trying to determine the average salaries for these types of positions across different locations so that they can negotiate with the client on how much of the employee's salary they will pay.



Warehouse employees

OTTO Work Force.

Due to the challenge of accurately forecasting demand through seasonality, it is common for companies to deploy strategies that allow for the number of workers to fluctuate along with the volume of demand.

Many 3PL's in the U.S. are experimenting with gig workers to help manage surges in demand; out of 100 fulltime equivalents, approximately 70 are salaried and 30 are contingent. Inbound or outbound pickers can usually be trained depending on the complexity the process.

Employees who are trained to use automation are typically salaried rather than contingent such as material handlers, automation operators, and maintenance individuals.

Similarly observed in Australia, a key contributor to the challenge of attracting and retaining staff is the tendency to hire casual employees, so if the demand drops, operators are not obligated to fire full time employees. In some instances, these strategies are deployed due to scarce labour but can also have an adverse effect in higher staff turnover.

Key Findings: Employment

Attraction and Retention Components

In addition to the previously mentioned factors, some warehousing jobs can be repetitive, physically demanding, and even dangerous. Due to the unattractive nature of the job, developers and operators look for other ways to make these positions more appealing. Industry experts from all regions shared a consensus that there are many components associated with employee attraction and retention, but among the top are salary, employee value proposition, and workplace environment and amenities.

Number one comes with no surprise – pay. Insights from developers and operators point out that pay incentives such as salary and bonuses are what gets people in the door, whilst providing amenities and a good work environment is what gets them to stay.

“There is a real focus on internal job hiring and growing own talent, over 50% of job vacancies in the past year were filled by internal staff. Giving staff the opportunity to grow their own career is another key reason people decide to stay with a company.”

Mark Simmons, GXO



Warehouse employees
OTTO Work Force.

Some companies in the UK and Ireland shared that they pay above the median rate because of the significant impact it has on attraction and retention.

Additional benefits that play a role include flexible working, customisable benefits structure, work culture, hygiene, leadership, and career opportunities. Organisations also put a large focus on internal career development programs.

It is important for staff to feel like they have an opportunity to grow their careers inside the company; in some cases, this can even be more important than pay. As proof to this claim, Mark Simmons shared an example where a large distribution centre with a reputable brand opened next door, offering to pay £1 more per hour. In the end, the company only lost 2 out of 1,000 staff to this competitor.

Having a culture and operating style that ensures workers feel motivated and valued is crucial for retaining talent.

The other approach companies are exploring is providing better facilities and additional services to take care of their staff. In some cases, in the UK and Ireland they are providing locker rooms, break out spaces, a learning facility to aid career growth, and some sites even include a gym depending on staff needs and commercial viability.

Implementing such a strategy is very dependent on the type of working conditions of the warehouse.

For example, in a fulfilment centre where the type of goods requires specific temperature conditions, the facility will be less concerned about controlling the temperature of the work environment.

The industry is seeing more and more examples of this, and conversations with industry professionals confirm that this trend is being recognised across different regions.

Additional findings on the rise of warehouse design and amenities are discussed in the following section.

Large Scale Smart Distribution Warehouse

Equipped with advanced technology for seamless operation.



Key Findings: Warehouse design and amenities

Warehouse design and amenities

General Trend

Generally, warehouse users are moving away from the idea that layouts must focus solely on optimising production and maximising efficiencies. Instead, organisations are beginning to place a growing emphasis on sustainable and human-centric design, as well as integrating amenities to be used by employees.

Initially this trend emerged in the U.S. with new warehouse facilities offering luxury amenities for staff. Although this is not yet the new ‘normal’, one example of this was a new ASOS distribution centre in Georgia that contains a gym, basketball courts, soccer field, learning centre, tech training area, wellbeing and mental health initiatives, pizza grill station, and even a pop-up nail bar ^[4].

Blue Apron’s new fulfilment centre in New Jersey, even offered massage therapy services to workers, which quickly turned into the most popular room in the building. Further research and interviews were conducted to investigate where else this is happening and identify other trends that are taking shape.

Insights can confirm that there is more consideration around amenities in warehouses now, however, there is a wide spectrum of amenity types and how common they are implemented in buildings. For example, some design features are a part of the physical building design, while others are additions to the space to improve staff experience.

Some are considered basic amenities while others are considered more luxury or rare.

There is another category of design components that are focused on sustainability and staff wellbeing.

[4] Brandt, L. (2019, January 26). Warehouses are Struggling to Attract Workers, and they’re Borrowing a Tactic from Luxury Real Estate to Entice a New Wave of Employees. Business Insider. <https://www.businessinsider.com/warehouses-luxury-amenities-to-attract-employees-real-estate-2019-6>

Foundational

Essential amenities that fulfil basic needs.



1. Clean restrooms
2. Break areas with seating
3. Drinking water stations
4. Adequate lighting
5. Safety equipment
6. Adequate ventilation
7. Basic kitchen facilities
8. Locker rooms
9. Parking stations



Enhanced

Additional amenities that improve comfort.



1. On-site cafeteria
2. Wellness rooms
3. Lounge areas
4. Fitness facility (e.g. gym, yoga studio)
5. Recreational facility (e.g. Ping pong tables, pool tables)
6. Ergonomic workstations
7. Access to natural light
8. Subsidised meals



Premier

Top-tier amenities that elevate employee experience.



1. On-site childcare facilities
2. Concierge services
3. Shuttle services
4. Learning centre
5. Tech training area
6. Advanced recreational facility (e.g. basketball courts)
7. Massage therapy station
8. Pop-up nail bar
9. Free meals



Key Findings: Warehouse design and amenities

Sustainable and Human-Centric Design

The focus on sustainability is evident worldwide, supported by initial research in the U.S. and further validated by insights from industry experts who indicated a global push towards more sustainable building design.

Developers explain that sustainability is not typically used as a method of attracting and retaining employees, however, it does improve the employee value proposition, as a sustainable warehouse signals success and a better work environment.

Many organisations are now beginning to also focus on gaining LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method) certifications. LEED, mostly popular in North America is a widely recognised green building certification that provides a framework for designing, constructing, operating, and maintaining environmentally sustainable and energy efficient buildings.

LEED assesses buildings based on a number of categories, such as energy efficiency, water conservation, materials and resources, indoor environmental quality, and sustainable site development. UK-originated BREEAM is similar and more popular in Europe.

Simultaneously, human-centric design is gaining prominence on a global scale.

“Modern offices in warehouses can easily rival the ones in central business districts for their quality or space and high comfort working environments.”

Tim Beckmann, Intospace

In Europe, Australia, and the U.S., developers are prioritising aspects like natural lighting, enhanced temperature control, and more greenery. Also, the wellbeing certification, WELL, is gaining prominence around the world.

WELL focuses on measuring, certifying, and monitoring features of the built environment that impact human health and wellbeing such as air quality, access to water, nourishment, light, fitness, comfort and mind.

In Australia, there are multiple examples of warehouses offering incentives to enhance the wellbeing of staff such as adding green space to common areas and introducing natural light through transparent roofing or windows.

Windows don't just add daylight, they also allow a worker to look outside, when placed correctly and connect with the world outside of their job.

A case in Europe further exemplifies this with the opening of a Levi's distribution centre in Germany where sustainable and human-centric design is the core framework for the facility.

The facility is not only expected to meet the majority of its own energy needs through renewable energy sources but is also LEED and WELL certified.

The developer of this facility also states how the company's cradle-to-cradle philosophy focuses on using safe, smart, and sustainable products in the development of a building to ensure a healthy environment for tenants.

A focus on nature-inclusivity, climate adaptation, biodiversity and/or integration with the surrounding landscape is another way to shape a sustainable warehouse.

Stellar Development created a distribution centre in Almelo, The Netherlands that is surrounded by a unique 1km-long ecological screen to ensure a natural connection to the surrounding characteristic landscape.

Because Stellar Development creates state-of-the-art logistics destinations where people want to be, they don't talk about distribution centres or warehouses but about destinations.

The driving force to go above and beyond and include sustainable or human-centric logistics real estate tends to be a long-term focus, luxury or ideology. Clients such as pension funds have a multi-decade focus and will create projects that won't be regretted by future generations.

Luxury brands owe it to their upscale clientele and quality commodities to think twice about their supply chains and associated buildings.

LVMH Moët Hennessy Louis Vuitton specialised in luxury goods, insisted that their New Jersey warehouse met the highest level of certification in the LEED program.

And idealistic developers and architects, such as the ones interviewed for this research, will push their clients and future tenants to go the extra mile and not just build another big box.

Destination Ara Almelo

Stellar Development creates state-of-the-art logistics destinations where people want to be.



Key Findings: Warehouse design and amenities

Amenities and Services

The heightened focus on amenities is another significant aspect of the shift away from traditional warehouse design. From interviews, it was apparent that breakout spaces and canteens are the most common amenities being provided to employees.

However, some organisations are going one step further by offering amenities such as gyms and childcare services which is particularly noticeable in organisations in the tech and pharma industry, due to increased competition for labour and deeper pockets.

“Pharma and tech are going above and beyond because, due to the value of their product, they want to hire the cream of the crop. They are more prone to offer higher salaries and amenities (i.e. better buildings, daycares, gyms, natural lighting, insulation) compared to other competitors, even more so than Amazon.”

Adalberto Guerra, Customised Distribution Services Inc.



In the U.S., the level of amenities offered can vary based on the type of logistics facility. Fulfilment centres, due to the nature of their operation, are often trying to get the most money from the least amount of space.

Therefore, these facilities are less likely to have extra amenities. Distribution Centres, on the other hand, are more likely to have amenities since there is a greater opportunity to negotiate some of these variables.

For example, if there is a 5-year agreement and the goal is to maintain people, the distribution environment can negotiate for a certain degree of amenities depending on what the client is willing to pay for.

Furthermore, if a facility is client-owned, amenities are included and paid for based on the client's own company culture, sustainability targets, and how they decide to take care of their own staff.

How this all looks in the end can vary; however, the result will reflect the priorities of whichever party is in control and leads these decisions through the development.

In any area of the market, some clients will not want to absorb the cost of the amenities without proof of the benefits, which will limit what can be done from the developer's side.

As a result, it may be very difficult for warehouse developers to ensure added amenities and sustainability are at the forefront of warehouse design, as clients address each site on a case-by-case basis.

As observed in Australia, often there is a disparity between the treatment of office and warehouse teams, with the latter often receiving hand-me-downs for their workspace needs.

This discrepancy is sowing seeds of division, undermining the unity of the workplace. To address this issue and ensure every team member feels valued, it is imperative to allocate a dedicated Capex and Opex budget for each warehouse annually.

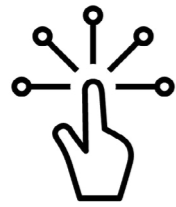
This will enable the warehouse manager to provide new, quality workbenches and chairs, rather than relying on outdated or used furnishings.

By investing in the wellbeing and comfort of the warehouse staff, it will demonstrate the organisation's commitment to fostering a supportive and inclusive environment for all.

“If we consider the office as the brain of our operation, then the warehouse is undoubtedly the heart. It's essential to treat it with the same care and affection as we would a heart.”

Andrew Oliver, Expeditors

Levi's Distribution Centre Dorsten
High quality break room.



Automation

General Trend

Various technologies, such as warehouse management systems, the Internet of Things (IoT) and robotics, have been widely adopted in the logistics industry, minimising manual operations and unplanned procedures.

To alleviate or eliminate human labour or limit the dependency on human labour, logistics operators have been adopting more advanced automation technologies, such as Automated Storage and Retrieval System (AS/RS), Autonomous Mobile Robots (AMRs) and robotic arms, to mechanise tasks in warehouses.

The level of automation does not significantly vary depending on the region, but it is more likely to depend on the size of the organisation, throughput, and how much automation can reduce costs. For example, a large warehouse operator with significant capital is much more likely to be able to deploy automation within a warehouse than a smaller organisation.

This view is validated in interviews, which highlighted that larger warehouse operators in the U.S. are up to 30% automated, whereas the rest of the industry is only about 8 to 10% automated.

Research in other regions suggests that this figure of 8% to 10% is relatively consistent across the globe.

In general, organisations show a desire to automate, however, it takes time to prove a strong return on investment and make the transition.

Therefore, although slowly, the industry is heading in the general direction of increased automation.

“The purpose of implementing automation in a warehouse is to improve the performance output. They are not implemented with the purpose of making the worker’s life easier.”

Andrew Oliver, Expeditors

Although the level of automation doesn’t vary much between different regions, motivations for deploying automation do seem to differ.

News reports and articles focused on the topic of automation suggest that in the U.S. and Australia, the primary reason for implementing automation into warehouse processes is to reduce the reliance on employees.

In these regions, automation allows organisations to fill the employment gap with robots which are capable of stocking, replenishing and order fulfilment processes.

This view was further supported by interviews which highlighted that in the U.S., “an automatic benefit [of automation] is a reduction in the number of employees needed”. Interviews conducted in Australia tell a similar story, with the rise in warehouse labour costs, a decrease in performance quality and worsening employee retention rates, driving organisations towards automation.

The compelling return on investment for automation is particularly evident in larger operations, therefore it is used as a strategic move aimed at cutting costs and boosting accuracy rather than solely focusing on enhancing worker comfort.

Interviews in the UK however suggested that the decision to automate is done on a case-by-case basis and reasons typically include specific client needs, safety initiatives, return on investment as well as the need to adapt to the workforce.

Further research supports the idea that, within the UK, there is a variety of reasons to implement automation, with improved picking accuracy, space shortages, return-on-investment, labour gaps, Covid-19 and Brexit all cited as reasons why organisations might implement automation in a warehouse.

Taking Hong Kong as an example, although labour shortages are observed in different types of logistics warehouses, there are several other factors considered when determining whether automation is necessary, such as the heterogeneity of inventory and scale of the companies, and maintenance costs.

30%

larger warehouse operators in the U.S. are up to 30% automated

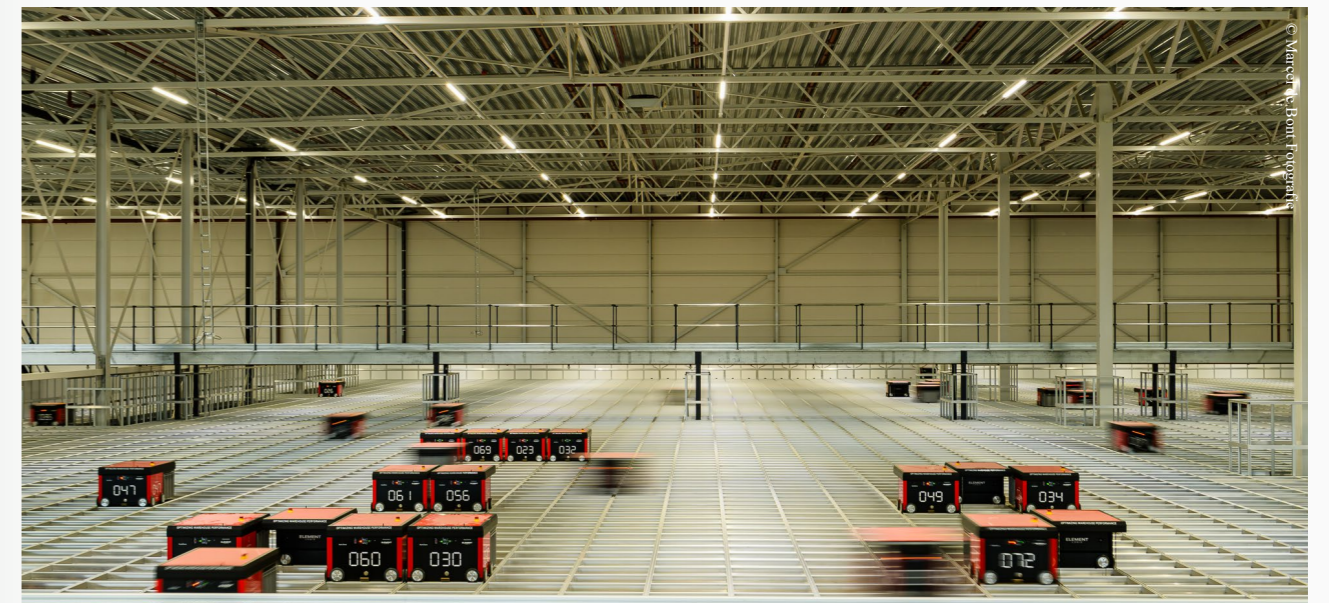
8-10%

of the rest of the industry is automated

These considerations significantly impact the decision-making process regarding the implementation of automation in warehouse operations, especially for the small and medium enterprises, which could explain the observed lower level of automation.

Autostore system

uses robots to bring goods to a wrapping station.



Key Findings: Automation

Impact on Employment

While labour shortages are not the sole driver for the implementation of automation in UK warehouses, both desktop analysis and interviews support the notion that automation can significantly alleviate the impact of labour shortages in the region.

Initial desktop research revealed a trend where various roles, including picking and packing, are progressively being taken over by robots and automation.

This observation was further substantiated by interview findings in the region that discovered, “automation plays a significant part in the employment strategy and proposition – investment in technology reduces reliance on people.”

Addressing labour shortages through automation is not a perspective unique to the UK, but apparent across other regions as well.

As previously mentioned, some organisations in the U.S. increase automation in response to labour shortages; approximately 30% of the workforce in a warehouse can be replaced by technology.

Additionally, automation can enhance the appeal of warehouse work, thus further mitigating labour shortages. In the U.S., “automation makes employees’ jobs easier, and people often find it more exciting to work with automation.”

“The same mechanics are typically maintained when you automate, they just need to broaden their responsibilities and skillset.”

Adalberto Guerra,
Customised Distribution Services Inc.

“Using robots for picking reduces labour needs, travel time, and increases the accuracy and scalability.”

Adalberto Guerra, Customised Distribution Services Inc.

These findings highlight the inclination in many parts of the world to increase automation in warehouses struggling to attract and retain labour. Conversely, engagement in some regions of Australia and Europe offered a different perspective.

Some warehouse labour forces have faced challenges in adapting to new technologies and processes (shifting from traditional warehouse practices). Interviews highlighted the challenge of hiring in an environment that uses automation, as employee demands are increased from both a technical and physical perspective.

However, this is not particularly common, even in the aforementioned regions, but it does highlight a need to ensure automation is implemented and managed in a way that suits the needs of the workforce, otherwise it may create further challenges.

Despite the ability for automation to reduce the need for certain jobs, interviews state that there will always be a need for people. This perspective shows that, while automation streamlines and enhances operational efficiency, it simultaneously generates new demands for a workforce with a different skill set.

The acknowledgment of this presents a need for organisations to invest in reskilling employees to align with the demands of emerging technologies. In the context of warehouse operatives, the transition to automation will not render their position obsolete; rather, it demonstrates a need to expand their responsibilities and technical abilities.

The adaptability and versatility of the workforce becomes pivotal as automation becomes more integrated industry wide.

A parcel carrier in Germany stated that the introduction of automation has not reduced their staff levels, but increased their productivity levels instead from 70 to 140 orders picked per hour.

There are other implications of automating and reducing the physical demand on tasks.

In warehouses with high levels of automation, positions that traditionally required a high degree of physical fitness can now be filled by a more diverse range of individuals, including those who may be less physically strong or have disabilities.

This broader accessibility to employment opportunities contributes to fostering an inclusive work environment.



Automation in warehouses can reduce the physical impact of the job.

Consequently, there arises a need to upgrade facilities and infrastructure to ensure accessibility for all staff, reflecting a broader societal shift towards inclusivity in the workplace.

Automation may have also led to harder jobs in some instances. Due to routing efficiency gains, an order picker is walking less and lifting more loads per hour adding to the strain of the job.

And even though the most repetitive roles are usually the first to be automated, some positions cannot be fully automated and what remains are tedious and soporific tasks.

“Automation reduces the physical aspect of the job, so we can attract less physically strong workers, even people with disabilities.”

Julian Hodenberg, Delta Development





Miscellaneous

There are other strategies and tactics that organisations may try to attract and retain employees.

Whilst there is little evidence to suggest it as an emerging trend, diversity and inclusion strategies help organisations attract a broader variety of employees, and therefore increases the potential labour pool.

In the UK, GXO ensures that when a new warehouse is opened, they employ staff from a wide range of backgrounds, which can include ex-offenders and people with disabilities, who traditionally may not be considered for employment.

In New Jersey, warehouse operators are known to approach the local transit provider to request a bus stop close by or change bus routes to be able to easier draw carless staff from other parts of the city.

One strategy used to boost employee morale is allowing music to be played in packing areas. This has been shown to create a significantly better working environment, in an area where roles tend to be very repetitive.

Organisations have also facilitated sporting activities and events designed to bring people together and keep people active and healthy.

Occasional cook outs or even free or subsidised meals and snacks are nice perks for employees. A Dutch grocery retailer is known to provide their warehouse staff with free meals prepared from almost spoiled, perishable ingredients that would otherwise have been discarded.

A combination of strategies designed to boost employee morale can go a long way to improve the working environment within an organisation, and therefore have a positive impact on retention of staff.

Some operators rethink the typical concept of a job. Some focus on building an atmosphere of having a career rather than a job. Others provide training opportunities for employees to retrain if their roles is about to disappear due to automation.

Dutch online supermarket PicNic provides employees the opportunity to combine two roles, working as an analyst 1-2 days per week and working in the warehouse for 2-3 days.

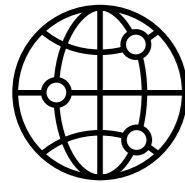
Providing a bit more variation and challenge, it also allows them to attract local university students and ensure they understand different parts of the business.

A New Jersey based warehouse operator started engaging with the surrounding communities by setting up a programme that allowed neighbouring residents to look inside, understand what they are doing and encourage them to consider an internship or entry-level job.



Attracting employees through diversity, inclusion and improved working environment.

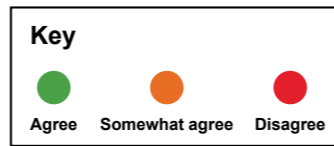
Key Findings:
Geographic Comparisons



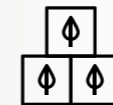
Geographic Comparisons



Employment



Key Findings	Australia	US	Hong Kong	Europe
There is a labour shortage to work in the warehousing industry.	●	●	●	●
Significant increase in labour shortage challenges post Covid 19.	●	●	●	●
Frontline workers labour cost increased (30% in some regions) post Covid 19.	●	●	●	●
Salary is the key to attract and retain warehouse workers.	●	●	●	●
Employment metrics are based on volumes not surface area.	●	●	●	●
Labour retention challenges have increased due to competition between warehouses for workers.	●	●	●	●



Warehouse Design and Amenities

Key Findings	Australia	US	Hong Kong	Europe
Shift towards human-centric design and employee amenities.	●	●	●	●
Importance of incorporating amenities due to increased competitions for labour.	●	●	●	●
Clients are not willing to absorb the cost of amenities without proof of the benefits.	●	●	●	●
The warehouse team is often overlooked in incentive schemes compared to the office team.	●	●	●	●



Automation

Key Findings	Australia	US	Hong Kong	Europe
The primary goal of implementing automation in warehouse processes is to minimise reliance on human labour (cost and errors).	●	●	●	●
Effective change management is crucial when introducing automation to an existing operation.	●	●	●	●
Warehouse staff generally welcome automation because it simplifies their tasks and improves job efficiency.	●	●	●	●

Implications

As client and customer priorities begin to change, the focus of warehouse developers must adjust.

Destination Ara Almelo - Stellar Development
The unique 1km ecological screen ensures a natural connection to this characteristic landscape.



Implications

Developers

Conversations with market leaders demonstrate an evolving landscape for the warehouse, moving away from the idea that a warehouse is merely a storage facility for goods.

Instead, there is an ever-increasing drive towards sustainability, flexibility, and improved employee conditions.

Developers have the power to reshape the idea of a traditional warehouse by ensuring these factors are common in future design, and fostering a proactive, rather than reactive, mindset will help developers keep up with ever-changing client needs.

Sustainable and Human-Centric Design

Sustainability is a particular priority, with net zero targets and influence of key stakeholders dictating the focus of developers' clients.

As a result, sustainable warehouse design is starting to come to the forefront of conversations and will soon be an expectation rather than an add-on.

As well as client priorities, sustainability is becoming a key focus for governments. In some areas of the world, LEED certification is a requirement for new buildings and both developers and operators should recognise this shift towards sustainable design and expect more guidelines to come into force in the coming years.

The transition to sustainable warehouse design in practice is beginning to be made, with concrete structures being replaced with eco-friendly materials in part to help even large warehouse facilities blend into their surroundings.

Conversations will be had with clients to discuss the impacts of strategies to reduce the carbon footprint and more information is needed on ESG strategies.

Cost will continue to be an important factor so that interventions can be justified, but warehouse developments can also have a positive impact in their neighbourhoods by, for example, exporting energy or providing charging infrastructure.

Human centric warehouse design and warehouse amenities are also becoming a key focus for developers.

It is apparent that first impressions count when potential employees view a warehouse, so attention should certainly be paid to the external area and façade of a building.



Destination Ara Almelo - Stellar Development

The unique 1km ecological screen ensures a natural connection to this characteristic landscape.

The importance of the external area is further highlighted now that many employees are beginning to expect some form of natural light within a warehouse, and warehouse developers should consider the levels at which windows are positioned, to allow workers to see the environment that surrounds their workplace.

Location

Selecting an appropriate warehouse location is also a fundamental decision for developers, with numerous factors needing to be considered.

While connectivity to road networks and ports is commonly factored in, the accessibility to a skilled labour pool and awareness of labour market competition are also critical to prevent potential labour shortages.

Additionally, the specific geographical placement of a warehouse plays a significant role in determining the amenities available. Amenities are often prioritised based on demand, as revealed through interviews conducted across multiple regions.

Therefore, proximity to other existing warehouses can allow for the creation of shared amenities like cafés, gyms, and green spaces, all of which can help attract more employees.

Future Proofing

The flexibility of space emerges as another essential consideration in warehouse development, especially when the identity of future tenants is uncertain.

Developers possess the ability to cater to a diverse range of prospective tenants by implementing features that future-proof buildings, accommodate sustainability plans, and incorporate a floorplan that can cater for the inclusion of various amenities.

This strategic approach ensures adaptability and attractiveness to a broad spectrum of tenants.

To account for all of the aforementioned features, warehouse developers would ideally form long term partnerships with clients, to understand and cater to their wants and needs.

Drawing attention to long term priorities can also help to recognise the need for sustainability and developing strategic relationships can help meet organisations' long term sustainability targets and help prevent issues regarding attracting employees.

Implications

Warehouse Operators

Now more than ever, there is competition to become the “employer of choice”.

While pay incentives and bonuses help to get people in the door, the company’s investment in their employees and workplace environment is what motivates people to stay.

Employees want to work in a comfortable environment where they feel safe, valued, and engaged.

Operators are the ones with the power to make this happen. This includes aspects like company culture, career growth opportunities, pay incentives, office activities, and general amenities.

Employee Offerings

Building amenities, large or small, are increasingly becoming part of the conversation early in the development process. Operators with more economic bandwidth can start to weigh commercial viability for larger amenities such as gyms, childcare services, pet spas, etc. depending on their employee’s needs.

However, no matter the size of your operation, there are certain basic amenities that are becoming expected as a standard for employee safety and wellbeing. This includes providing food and drinks, lockers, break rooms, and spaces for staff to walk, sit, and eat that is separated from truck activity or other warehouse operations.

Similarly, design components to make the workplace more comfortable and human-centric, such as natural lighting and controlled temperature, are becoming common and impactful.



Levi's Distribution Centre Dorsten
Comfortable interior.

It is important for operators to consider both external and internal initiatives. Some operators are choosing to provide extra amenities and services, while others are putting more emphasis on developing programs within their organisation.

This consideration can be dependent on the organisational structure of your employees, and whether there is a greater need for frontline starter positions, managerial positions, or technically trained staff.

Internal programs like graduate schemes, training initiatives, and learning centres are being provided to give employees a chance to invest in their own future with the company.

Giving employees the opportunity to advance their careers internally has proven to be an effective way of filling vacant positions and without spending extra time and money searching for new staff.

Choosing to Automate

The decision to automate comes with similar considerations. Depending on the level of automation and type of required staff, it can help with staff availability but may create additional challenges.

Automatising small and repetitive tasks can cause a reduction in overall workforce required. In some cases, automation can deplete the quality of a job, causing workers to feel burnt out by monotonous or boring tasks.

Inversely, some levels of automation can help staff value their jobs more because they receive higher technical training and can take on more responsibility. Internal training programs and proper change management are critical to make this a success.

Operators should consider these factors when deciding to automate based on what will best suite the needs of their workforce.

Sustainability

Operators should also expect to see more developers pushing to implement sustainable design in new developments or reconstruction projects. In the next 5 to 10 years, sustainable design is going to be on the forefront of new and existing operations due to their 2030/2040 net zero targets.

Developers with this focus prefer to work with operators that share their philosophy and can align with project priorities.

The developing group of the new Levi's warehouse deemed to be the “greenest warehouse in Germany” emphasises the importance of working with a client that is willing to prioritise these initiatives because 50% of it depends on them (e.g., deciding what will be served at the canteens, etc.).



Employee attraction
through activities and amenities.

Implications

Integration of a distribution centre in the cityscape

Surrounded by extended stay apartments and covered by PV cells and communal spaces.



Implications

Municipalities

Municipalities also have an important role to play in shaping the quality of the workplace at a warehouse.

Quality of the Public Realm

Municipalities can dictate many qualities of the public realm in an industrial business or logistics park.

They can set minimum demands for aesthetics to raise the architectural value of the proposed buildings. They can plan for safe access by ensuring separated bicycle lanes and dedicated, continuous sidewalks with safe pedestrian crossings.

In collaboration with the local transport authority, they can foster equal accessibility by providing local bus or tram stops and by ensuring transit lines that connect well with other lines throughout the city.

By setting up minimum standards or guidelines on climate resilience, water retention, biodiversity, compensation of lost green areas, they can influence the outdoor area quality of industrial parks, preventing heat island effects and allowing for tranquil spaces for labourers to retreat or stroll during their breaks.

Zoning Exceptions

Most cities will have a comprehensive zoning ordinance or zoning plan dictating a separation of land-uses. These are typically aimed at protecting residential zones from relatively noisy, dangerous and/or polluting commercial and industrial land-uses.

But a less-strict approach might provide some breathing space for warehouse tenants trying to attract and retain staff.

A municipality could issue a (temporary) environmental permit or zoning ordinance that allows for (temporary) residential use in industrial or logistics zones.

Residences for labour migrants near warehouse operations might make it easier for them to work in a warehouse rather than a completely different sector elsewhere in town. Permitting other zoning types can help accommodate certain functions near warehouse workers that might attract them to an area, even if their employer cannot afford luxury amenities.

All logistics park tenants could perhaps jointly afford or subsidise a daycare facility that would be too expensive for just one tenant.

Another approach would be to deviate from clustering warehouses in logistics parks. A single distribution centre by itself would only generate a limited number of truck trips, which over time will be replaced by quieter and cleaner zero-emission vehicles, making the building easier to integrate in residential areas, or making it easier for a municipality to allow for it to be surrounded by residential or recreational use.

Deviating from temporary zoning permits would allow developers to build high quality housing or apartments rather than short-term housing projects.

To accommodate labour migrants, these residential units could be extended stay apartments and alleviate the pressure on the housing market in residential neighbourhoods. In a similar fashion these could serve labour migrants and knowledge migrants in a more high-tech campus setting.

Whichever solution is considered, warehouse space in or very close to urban areas is forecast to grow and municipalities will need to set out how they will plan for these requirements in a sustainable way.



Interior and exterior of KaFra Tower Zevenbergen for labour migrants.

Warehouse of the Future

The future of the warehouse may be bright. Its architectural qualities may be lifted and it will no longer look like a typical big box.

Rhenus Distribution
Centre Tilburg



Warehouse of the Future

It may even blend in with its landscape and have green facilities that support biodiversity and climate adaptation.

Its location is not necessarily clustered with other warehouses in a logistics park; or other land-uses such as (temporary) housing and daycares may be integrated in logistics parks instead.

It will likely contribute to generating part of its own energy demand and its design will benefit the humans working inside through programmes and amenities and physical attributes that make for a pleasant working environment.

Its operators may also engage in non-tangible activities to improve the working atmosphere.

Its tenants will actively be engaging with the community to ensure mutual understanding of their needs and prepare the next generation of warehouse employees.

The majority of these features may not be primarily focused on human wellbeing, but will still allow employees to work in a healthier and happier warehouse work environment.

House of Goodman



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