

Warehouse Insights

# Future of Work in Intralogistics



# Introduction

Present challenges. Changing needs.  
Innovative solutions.

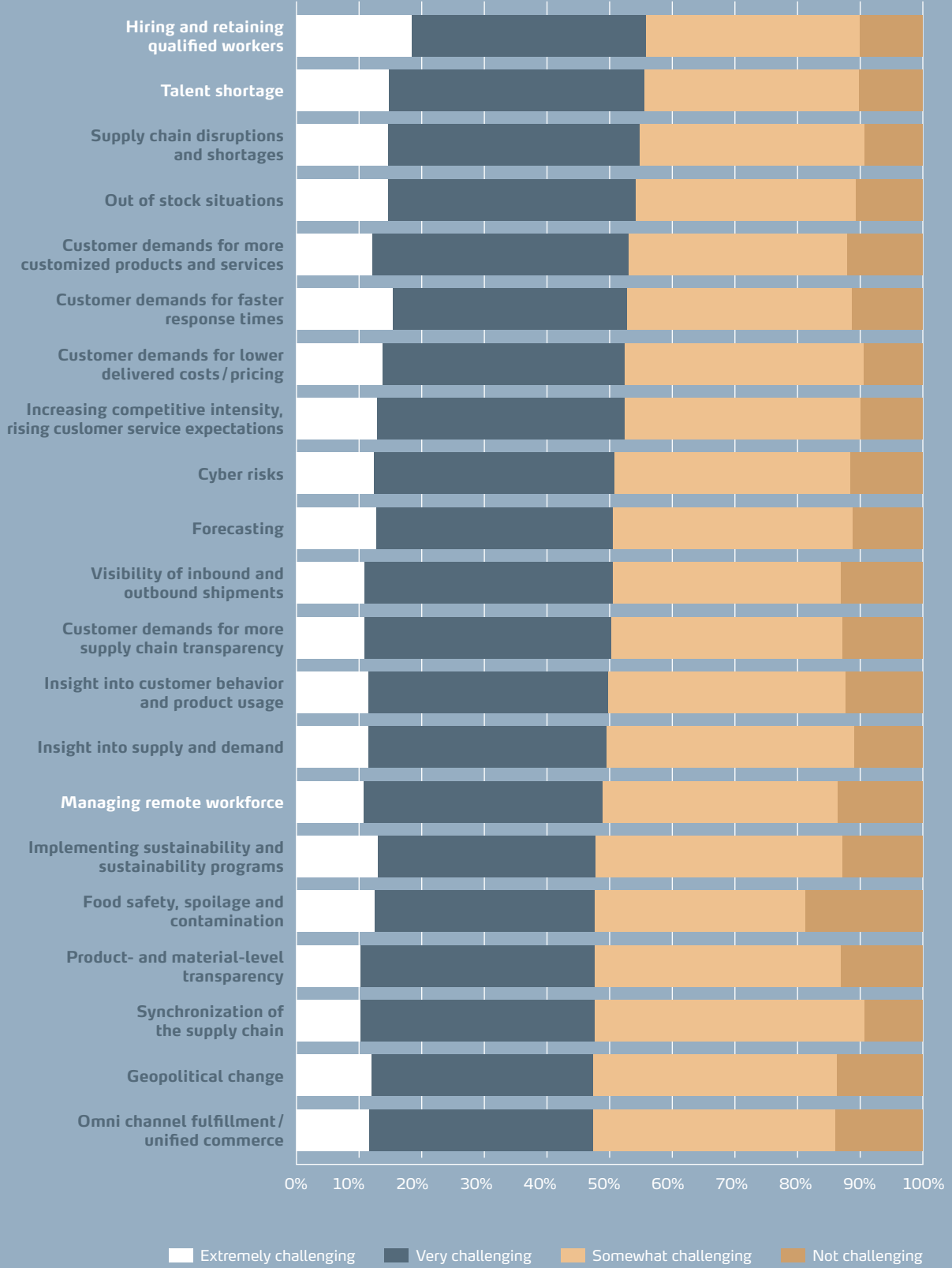
**Amid a world of talent shortages and lingering effects of the pandemic,<sup>1</sup> the working world must adapt at an extraordinary pace. The intralogistics industry is no exception and has its unique struggles. As a global industry player, Kardex collaborates first-hand with organizations to overcome these and other challenges with innovative, safer and more ergonomic solutions.**

Nothing prompts change better than a challenge. Intralogistics is encountering several industry-specific challenges, as reported by MHI in their 2023 Annual Industry Report. The majority of organizations surveyed (56%) consider the talent shortage a big challenge; hiring and retaining skilled employees is particularly challenging.<sup>2</sup>

Fueling the labor shortage is the demographic shift creating challenges on both ends of the age spectrum. Firstly, organizations face losing valuable institutional knowledge gained over decades by experienced employees who are now on the verge of retirement. Secondly, attracting fresh talent is difficult due to the mindset, preferences, and needs of younger generations.<sup>1</sup>

Regardless of age, employees within intralogistics are confronted with personal financial pressures due to inflation, the physical demands of manual warehouse work, and often a language gap between colleagues and the machines and systems used in warehouses. These factors combined indicate that the labor shortage is projected to intensify, potentially becoming a persistent issue.<sup>3</sup>

While new hires and temporary employees can ease the tensions of the labor shortage, the fluctuation of staff, whether due to illness, seasonal demands or economic conditions, remains high. This challenge raises additional concerns about workplace safety due to these employees' developing skills and abilities. With the pressure of high costs in full force, warehouse operators must proactively handle the talent shortage while considering what employees need and value: physical and psychological ergonomics.<sup>4</sup> Changes are already taking place within the industry to find solutions through automation and other technologies.<sup>5</sup>



Source: MHI Annual Industry Report 2023

# A more ergonomic experience

**It is not just the physical warehouse environment that gains from modern changes like automation, data-driven technologies, and networked devices. Employees' experiences are vastly improved through technology.**

## Enhancing the workforce

The labor shortage and the rising average age of employees in intralogistics mean that companies have to invest in more ergonomic working conditions.<sup>3</sup> Ergonomics focuses on people as the most valuable resource by adapting working conditions to minimize physical and mental health hazards. Long-term effects of manual labor can be minimized by supporting people as best as possible in the execution of their activities. The goal is to reduce strain on people and increase efficiency.<sup>6</sup>

At its best, standard automated picking uses robotic or semi-robotic technologies with human employees to improve throughput and boost efficiency.<sup>7</sup> Warehouse processes become quicker and more seamless as walking time is reduced, picking routes are shortened, and the work environment becomes safer.<sup>8</sup> Automated storage and retrieval systems (ASRS)<sup>9</sup> offer high-compact storage, accurate inventory control, accelerated picking, improved fulfillment, and take the physical and mental pressure off of (particularly new and temporary) employees, thus directly increasing their comfort, efficiency and safety while decreasing training time. The Kardex Color Pick System provides these and additional benefits, like allowing warehouse managers to add or reduce staff based on current order demands.<sup>10</sup> This leads to higher functionality, improved ergonomics, and enhanced performance.

A Natural User Interface (NUI) is a set of interconnected physical devices that can be integrated into the environment, allowing for natural movements and tactile feedback. They can be sensors or projections that transform the human body, clothes, and other surfaces like tables or walls into interactive surfaces. This replaces traditional input methods with more convenient, simpler, and accurate methods.<sup>11</sup> The Kardex Intuitive Picking Assistant uses NUI technology to project all relevant picking information on the surface of the access opening. Employees are guided by colored lights to which items, from which bin, and how many to pick. In addition, the system checks whether the operator has picked from the correct location and will inform the operator in the case of a mispick. With this system, information overload is avoided, and training of new staff is eased as this solution intuitively guides and confirms each step in the picking process. Different user settings tailored to individual needs make the operation as ergonomic and language-friendly as possible.<sup>12</sup>



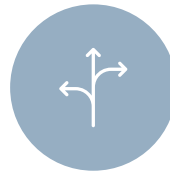
## Other technological advances for warehouse employees

Closely connected to NUIs are wearables (glasses, watches, bracelets, rings, patches, etc.) that act as digital extensions of larger devices seamlessly integrated into natural human movements and activities. As part of a warehouse, wearables can track employee activities and provide data to inform prediction models, thus allowing employees to work hands-free. They can measure vital data to aid in optimizing physical safety.<sup>13</sup> One such warehouse employee wearable vibrates or beeps when a hazardous movement such as bending and twisting is performed. This creates awareness and triggers a behavior change over time, reducing the number of unsafe movements performed.<sup>14</sup>

MHI predicts the adoption rate of wearable technology within the next five years to be as high as 80%.<sup>2</sup> Wearables will allow employees to:<sup>15</sup>



Accomplish tasks with greater efficiency



Complete tasks with greater flexibility and mobility



Achieve higher levels of accuracy



Acquire information more easily

## Wearable technology also enables management to better:



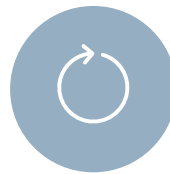
Visualize and monitor operations without having to be on the floor



Communicate and collaborate with employees



Anticipate and tackle problems that might affect productivity



Adapt to continuing improvements in technology

Wearables make advancements like augmented (AR) and mixed realities possible by enabling interaction and immersion with digital content.<sup>13</sup> Extended Reality (XR), i.e., encompassing AR, virtual reality, and mixed reality, makes operational processes more efficient and less prone to human error, which can aid with quickly onboarding new employees. DHL considers XR a trend to monitor closely.<sup>16</sup>

Another upcoming trend made possible by human-machine interaction is Digital Twins – a virtual representation of a material object, including all the processes that influence it. This could be a large-scale construction process, a simulation, or predicting disruptions.<sup>17</sup> Practically all processes within supply chains can benefit from the trend of Digital Twins. From appropriately allocating workloads to efficiently managing inbound and outbound flows, a Digital Twin can facilitate logistics optimization through visibility. In implementing Digital Twins for specific supply chain processes, logistics organizations can potentially reduce the cost, time, resources, and waste previously incurred when completing tasks.<sup>18</sup>

Overall, technology can support employees in countless ways: fostering new capabilities and behaviors, improving operational performance, increasing safety, and supporting a more optimal ergonomic environment. In particular, these and other new workplace technologies are emerging that don't just augment employees and perform mundane work. Instead, they can help individuals and teams upskill and reskill their capabilities when used strategically.<sup>2</sup>

# More productive intralogistics

**According to Deloitte's 2023 Global Human Capital Trends survey, nearly all companies (93%) recognize the importance of powering human impact with technology to improve work outcomes and team performance. Still, only 22% believe their organizations are ready to do so.<sup>2</sup> An MHI report shows that organizations are investing in supply chain technology and innovation.<sup>2</sup> The interest and the funds are there, yet the readiness is lacking. By 2025, 52% of workplace tasks are expected to be done by machines.<sup>1</sup> Now is the time to start considering which modernizations are required for your warehouse.<sup>19</sup>**

## Automation, robotics, and the warehouse production process

As organizations continue to deal with talent shortages and manual working conditions, warehouse automation can be a powerful tool in overcoming both obstacles.<sup>20</sup> Automation is an economically advantageous solution that can run error-free intralogistics processes, thus attracting and retaining employees and providing safer, more ergonomic working conditions. It is especially useful for standardized and recurring processes. Other advantages of automation include:<sup>21</sup>

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- ✓ More efficient material flow

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  - ✓ Easy, space-saving integration into existing environments

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  - ✓ Scalability – grows with your business

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  - ✓ Faster reaction in critical processes

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  - ✓ Saves time and money

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As the warehouse of tomorrow is being called “digital, automated, and sustainable,”<sup>22</sup> automation and digital technologies like robots are now being considered fundamental requirements and will continue to be key critical components of successful supply chains in the future.<sup>2</sup> Whether partial or full automation, it is predicted that these technologies will rapidly improve and expand in what they can offer to benefit employees and customers.<sup>23</sup>

Robots are one of the defining features of an automated warehouse. Autonomous robots can swiftly and agilely maneuver transports across warehouse floors without any artificial landmarks to guide them.<sup>24</sup> MHI predicts that robotics (together with automation) will have an adoption rate of nearly 80% within the next five years.<sup>2</sup> Robotics solutions offered by Kardex combine software and hardware mechanisms using 3D cameras, grippers, and smart software algorithms. The technology allows the robots to precisely recognize, grip, and locate objects. They provide safe, high-performance picking and placing for various items.<sup>25</sup>

To maintain or even increase productivity, automation and robotics do not replace an employee; rather people and machines work together in the value chain.<sup>26</sup> This collaboration means more ergonomic working conditions,<sup>3</sup> i.e., improved health and safety while reducing physical and mental stress for employees.<sup>27</sup>

DACHSER, a Kardex Mlog customer, experienced this exact result with their new fully automated high-bay warehouse. With the interconnectivity of the warehouse, the quality of work increases with routine tasks handled by the technology and more demanding focused tasks dealt with by the employees. As all processes are linked and every manual task impacts automated processes, the employees’ work is extremely versatile and varied.<sup>28</sup> It is anticipated that implementing proactive, automated solutions like this will take the pressure off of the workforce and offset the ongoing talent shortage.<sup>2</sup> Older employees can feel empowered and encouraged to stay in the workforce longer, especially with the physical strain being alleviated.<sup>3, 27</sup> For younger employees, a more creative, technology-driven work environment is fascinating.<sup>3</sup>

Automation and robotics in warehouses will impact employee comfort and satisfaction, the quality of work, and recruitment.<sup>3</sup> More importantly, on-the-job training of new or temporary employees is more straightforward and the work environment for employees and goods is safer.

## Optimizing the process with artificial intelligence and machine learning

With just over 70% of warehouses planning to go beyond automation by adopting artificial intelligence (AI) to optimize processes,<sup>2</sup> it is clear that AI is being considered a key technology in the application of the smart warehouse.<sup>29</sup> For example, to avoid long delivery times and incorrect shipments, AI and machine learning solutions help coordinate all logistics processes and ensure structured item and customer master data maintenance.<sup>30</sup>

As one of the most digitized business sectors, intralogistics has the big data required for AI to analyze and for machine learning to act upon. With the ability to spot patterns, AI is useful for informing on shipping requirements with an influx of orders or predicting the ordering behavior of customers.<sup>29</sup> Based on these experiences, machine learning technology can analyze and improve future shipping and ordering processes.<sup>31</sup>

 [Learn about 4 ways AI transforms intralogistics](#)

For warehouses, AI and machine learning can help manage inventory, pick orders in advance, fill the gap during talent shortages, avoid unexpected disruptions, and inform on upcoming machinery maintenance.<sup>32</sup> Kardex Connect, a proactive monitoring system, securely collects and analyzes operational data to aid in remote support, leading to high machine availability and more efficiency.<sup>33</sup>

 [Read more about Kardex Connect](#)

## IoT for more efficient intralogistics

MHI's Annual Industry Report 2023 states that the Internet of Things (IoT) tops the innovations expected to be widely adopted over the next five years.<sup>2</sup> IoT is a network of physical objects (things) embedded with sensors, software, and other technologies to connect and exchange data with other devices and systems over the internet.<sup>34</sup> With technologies like data analytics, blockchain, and AI, IoT can improve and speed up the actionable data that can be shared up and down your supply chain.<sup>2</sup> This can mean automated warehouse operations, optimized resources, properly utilized space, improved forecasting (including workforce planning), and inventory management.<sup>35</sup>

 [Learn more about IoT and its implications on intralogistics](#)



# Future skillset

**To stay ahead of the competition and develop a workforce that is positioned to thrive in the face of changes and disruptions, warehouses need to invest in their most important asset: their people.<sup>2</sup>**

## A culture of learning

Investing in your current and future workforce and implementing programs to recruit, develop, and build a culture that retains employees will be key to long-term success.<sup>2</sup> Effective implementation to motivate employees requires a proper understanding of the thoughts and needs of the workforce and those of incoming generations.<sup>36</sup> With most employees expected to be Millennials and Generation Z, logistics leaders must align incentives, tools, values, and more to attract and retain employees.<sup>1</sup>

## Developing digital and software skills

Warehouses considering whether to adopt new technology like automation or not should think about what the move might look like to an employee. If employees can see the added value for themselves and the company, they will ultimately see this technology as a way to make work easier and support the change.<sup>3</sup> Then there are those employees looking to work at a company where exciting new technology is being used to create the future global supply chain. These employees want to work alongside technology. They often see these job positions as opportunities for career advancement with the ability to focus on more value-added tasks within the operation. Of course, there is also the cool factor of working with advanced technology.<sup>20</sup>

Adopting technology has implications for your existing workforce in terms of developing their skill sets. According to the MHI Annual Report, the past few years have seen a 15% increase in organizations investing in upskilling and reskilling programs, with 41% focusing on preparing their employees for new tech-forward supply chain jobs.<sup>2</sup> Considerations should be made for older employees, who may require different resources, settings, and learning pathways to acquire fluency with new technology tools.<sup>27</sup>

## The value of diversity, equality, inclusion, and belonging

For organizations that want to bolster effectiveness, productivity, dynamics, and creativity while ensuring individuals have equal opportunities and feel valued, the Diversity, Equality, Inclusion and Belonging (DEIB) trend cannot be overlooked. When individuals recognize that a human resources department prioritizes DEIB, especially the belonging dimension, they are less likely to leave. A 2021 study found that 40% of respondents with a strong sense of belonging rarely think about looking for a job in another company, versus 5% of respondents with a low sense of belonging. Still, diversity, equity, inclusion, and belonging go far beyond human resources concepts. When successfully embedded in the organization's core values, they leverage the collective backgrounds and experiences of everyone (including leadership). This inspires new ways of thinking and sparks fresh ideas. When DEIB is at the forefront of a job applicant's mind and is a priority item on a business agenda, this is pivotal to the company's future success.<sup>37</sup>

Investment in continuous learning and adapting organizations to match changing employee mindsets can reduce the impact of chronic talent shortages and an aging population, improve employee equality, promote inter-generational learning, and help create a more resilient and agile workforce.<sup>2</sup>



# Summary

## Employees are the future of intralogistics

A 2023 Deloitte global survey found that only a quarter of respondents are highly confident they have the right workforce composition and skills for the future. A key conclusion was if companies aren't looking at technology right now and don't have sufficient labor within their operations, they will lose ground to their competitors.<sup>2</sup>

It is clear that warehouse automation, technology systems, flexible work systems, and upskilling will help businesses future-proof and stay competitive.<sup>36</sup> In fact, all the technologies mentioned function together in an ecosystem that, when appropriately implemented, can take organizations to the next level of resiliency and agility. Perhaps more importantly, automation can vastly improve the safety and ergonomics of warehouse working conditions.

Upcoming trends and technologies provide the business case for more transparent, sustainable, and responsible supply chains. And getting there requires well-trained people to implement this innovation successfully. The key to success is not only a commitment to innovation but a commitment to the workforce.



Contact us

# References

- <sup>1</sup> DHL. "Future of Work Interactive Report" Accessed June 2023. <https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/future-of-work/interactive-report.html>
- <sup>2</sup> MHI. "2023 MHI Annual Industry Report: The Responsible Supply Chain". Data on file.
- <sup>3</sup> STILL. "Automatically unemployed?" Accessed June 2023. <https://www.still.de/en-DE/trucks/new-trucks/tugger-trains/it-pulls-automatically/automatisation-and-human-resources-in-intralogistics.html>
- <sup>4</sup> MHL: Warehouse Automation. "ASRS as a solution to the labor shortage" Accessed June 2023. <http://www.warehouseautomation.org/2022/07/12/asrs-as-a-solution-to-the-labor-shortage>
- <sup>5</sup> Linde. "Increase in warehouse automation triggered by labour shortage" Accessed June 2023. [https://www.linde-mh.co.uk/en\\_uk/About-Linde/Press/Local-News/Labour-shortages-in-warehousing.html](https://www.linde-mh.co.uk/en_uk/About-Linde/Press/Local-News/Labour-shortages-in-warehousing.html)
- <sup>6</sup> TrendManager, Mega-Trend: Heathstyle, "Macro-Trend: Ergonomics". Data on file.
- <sup>7</sup> TrendManager, Mega-Trend: Exponential Industries, "Macro-Trend: Automated Picking". Data on file.
- <sup>8</sup> River Systems. "What is automated warehouse picking?" Accessed June 2023. <https://Griver.com/what-is-automated-warehouse-picking>
- <sup>9</sup> Kardex. "Automated Storage and Retrieval Systems (ASRS)" Accessed June 2023. <https://www.kardex.com/en/applications/storage-retrieval>
- <sup>10</sup> Kardex. "Solution Guide: Kardex Color Pick System" Accessed June 2023. [https://cdn.bfdr.com/EL3HU3A3/at/r8f8j98jp2gbf53tz28q4xg/SolutionGuide\\_EN\\_KardexColorPickSystem](https://cdn.bfdr.com/EL3HU3A3/at/r8f8j98jp2gbf53tz28q4xg/SolutionGuide_EN_KardexColorPickSystem)
- <sup>11</sup> TrendManager, Mega-Trend: Smart Surroundings, "Macro-Trend: Natural User Interfaces". Data on file.
- <sup>12</sup> Kardex. "A New Way of Picking – Intuitive Picking Assistant" Accessed June 2023. <https://info.kardex.com/en/pillar-page/general/ipa/kx/gl>
- <sup>13</sup> TrendManager, Mega-Trend: Engineered Evolution, "Macro-Trend: Wearable Technologies". Data on file.
- <sup>14</sup> DHL. "Wearable Sensors" Accessed June 2023. <https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/wearable-sensors.html>
- <sup>15</sup> Invata. "How wearable technology can enhance warehouse automation" Accessed June 2023. <https://www.invata.com/how-wearable-technology-can-enhance-warehouse-automation>
- <sup>16</sup> DHL. "Extended Reality" Accessed June 2023. <https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/augmented-and-extended-reality.html>
- <sup>17</sup> TrendManager, Mega-Trend: Virtualisation, "Macro-Trend: Digital Twin". Data on file.
- <sup>18</sup> DHL. "Digital Twins" Accessed June 2023. <https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/digital-twins-supply-chain.html>
- <sup>19</sup> Kardex. "Warehouse Modernization" Accessed September 2023. <https://www.kardex.com/en/support/warehouse-modernization>
- <sup>20</sup> Swisslog. "Using Automation to Attract Warehouse Workers" Accessed June 2023. <https://www.swisslog.com/en-us/case-studies-and-resources/blog/using-automation-to-attract-warehouse-workers>
- <sup>21</sup> Grenzebach. "Transforming Intralogistics" Accessed June 2023. [https://www.grenzebach.com/fileadmin/Grenzebach\\_Group/Intralogistics/Brochure\\_Grenzebach\\_Transforming-Intralogistics\\_en.pdf](https://www.grenzebach.com/fileadmin/Grenzebach_Group/Intralogistics/Brochure_Grenzebach_Transforming-Intralogistics_en.pdf)
- <sup>22</sup> YouTube. "Warehouse of the Future" uploaded by KION Group, May 1, 2022. <https://www.youtube.com/watch?v=DltJSLF8mgI>
- <sup>23</sup> Kapelou EU. "Intralogistics trends in 2022" Accessed June 2023. <https://kapelou.com/en/blog/intralogistics/trendi-intralogistiki-2022>

- <sup>24</sup> Jungheinrich. "The future of intralogistics" Accessed June 2023. <https://www.jungheinrich.com/en/press-events/the-future-of-intralogistics-1334798>
- <sup>25</sup> Kardex. "Solution Guide: Overcome Labor Shortage" Accessed June 2023. [https://cdn.bfdr.com/EL3HU3A3/at/3gtpnxzjnq958bw4vnpf7px/SolutionGuide\\_EN\\_OvercomeLaborShortage](https://cdn.bfdr.com/EL3HU3A3/at/3gtpnxzjnq958bw4vnpf7px/SolutionGuide_EN_OvercomeLaborShortage)
- <sup>26</sup> Logistik Heute. "Intralogistik: Das sind die 5 wichtigsten Trends fuer 2023" Accessed June 2023. <https://logistik-heute.de/news/intralogistik-das-sind-die-5-wichtigsten-trends-fuer-2023-38784.html>
- <sup>27</sup> DHL. "Silver Economy" Accessed June 2023. <https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/silver-economy.html>
- <sup>28</sup> You Tube. "People in the new high-bay warehouse in Memmingen" uploaded by DACHSER, July 26, 2023. <https://www.youtube.com/watch?v=Z2G963k9ttQ>
- <sup>29</sup> Bito. "Possible applications of AI in logistics" Accessed June 2023. <https://www.bito.com/en-gb/expert-knowledge/article/possible-applications-of-ai-in-logistics>
- <sup>30</sup> Hannover Messe. "Artificial intelligence in intralogistics" Accessed June 2023. <https://www.hannovermesse.de/en/news/news-articles/artificial-intelligence-in-intralogistics>
- <sup>31</sup> Columbia Engineering. "Artificial Intelligenece (Ai) vs. Machine Learning Accessed June 2023. <https://ai.engineering.columbia.edu/ai-vs-machine-learning/#::-:text=Put%20in%20context%2C%20artificial%20intelligence,and%20improve%20themselves%20through%20experience>
- <sup>32</sup> Montratec. "How Ai Optimizes Assembly Intralogistics Through Machine Learning" Accessed June 2023. [https://www.montratec.de/en/blog/detail/news/how-artificial-intelligence-optimizes-assembly-intralogistics-through-machine-learning/?tx\\_news\\_pi1%5Bcontroller%5D=News&tx\\_news\\_pi1%5Baction%5D=detail&cHash=8369265acb867bd9432503bd69cb1e69](https://www.montratec.de/en/blog/detail/news/how-artificial-intelligence-optimizes-assembly-intralogistics-through-machine-learning/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=8369265acb867bd9432503bd69cb1e69)
- <sup>33</sup> Kardex. "Kardex Connect" Accessed June 2023. <https://www.kardex.com/en/support/kardex-connect>
- <sup>34</sup> Oracle. "What is IoT?" Accessed June 2023. [https://www.oracle.com/in/internet-of-things/what-is-iot/#::-:text=The%20Internet%20of%20Things%20\(IoT\)%20describes%20the%20network%20of%20physical,and%20systems%20over%20the%20internet.](https://www.oracle.com/in/internet-of-things/what-is-iot/#::-:text=The%20Internet%20of%20Things%20(IoT)%20describes%20the%20network%20of%20physical,and%20systems%20over%20the%20internet.)
- <sup>35</sup> Forbes. "The IoT-Powered Logistics Industry: Use Cases, Benefits and Challenges" Accessed June 2023. <https://www.forbes.com/sites/forbestechcouncil/2023/02/21/the-iot-powered-logistics-industry-use-cases-benefits-and-challenges/#>
- <sup>36</sup> TrendManager, Mega-Trend: Future Skillsets, "Macro-Trend: Future Work in Logistics". Data on file.
- <sup>37</sup> DHL. "Diversity, Equality, Inclusion, Belonging" Accessed June 2023. <https://www.dhl.com/global-en/home/insights-and-innovation/thought-leadership/trend-reports/diversity-inclusion-supply-chain.html>