



IS THE LIGHTS-OUT WAREHOUSE COMING?

ABSTRACT

From manual to fully automated, what's ahead for the warehouse robotics market?

What is lights-out warehousing? The simple answer is a facility without people. One that relies entirely on automated equipment, to the point that no manual touches are necessary. With no employees required on the floor, operations do not need to turn the lights on, hence the term “lights-out warehousing.”

Lights-out is not a new concept, especially in manufacturing, but in reality, such facilities are extremely specialized and extremely rare. While **industry experts** say that few companies are actively seeking a completely dark facility, today's warehouse and distribution operations are nonetheless interested in using automation as extensively as possible.

And why shouldn't they be? The increasing capability of robotics and significant labor challenges facing supply chains certainly incentivize greater adoption. But as warehouses and distribution centers add automation, is a lights-out facility on the horizon? This white paper seeks to answer that question, examining the industry forces and technologies that lead operations to adopt robotics and automation.



MORE LABOR CHALLENGES, MORE ROBOTS

Today's robotics solutions are more advanced than ever, capable of taking on more and more of the warehouse workload. Self-driving vehicles can move loads from point A to B; robotic arms can pick and place individual items, and still, other robotic solutions can load and unload freight on the dock.

LogisticsIQ estimates the warehouse automation market will grow to \$27 billion by 2025, up from \$14 billion in 2019 – a compound annual growth rate of 11.7%. This growth is powered by the intersection of key technology advances and major labor challenges.

The labor challenge boils down to this – businesses lack the staff necessary to handle the physical and repetitive tasks of the distribution center. And the labor that is available is expensive and prone to high turnover.

But how high? Depending on who you ask, the turnover rate for warehouse labor is in the neighborhood of **25-36%**. According to a survey in the **2018 MHI Annual Report**, finding, hiring, and retaining talent remain top challenges for supply chain organizations, with over 60 percent of respondents identifying retention as “somewhat” or “extremely” challenging.

WHAT IF YOU JUST TURN THE LIGHTS OUT?

As more solutions emerge to automate individual tasks, entire processes can eventually be handled with zero manual touches. For example, to fully automate order fulfillment, robotic gripping technology can pick and place individual items, while an autonomous mobile robot can move inventory into position for picking and take away completed orders. This produces a complete order fulfillment cycle with no manual intervention.

Solutions like this that fully automate or even partially automate a process can significantly increase a warehouse's labor efficiency and significantly reduce headcount, thereby helping to overcome labor challenges. Rather than a staff of hundreds engaging in repetitive, low value-added tasks, a smaller staff with a high level of technical skill would be required to keep operations moving.

But turning out the lights is not so simple! This also creates a new, “second wave” labor shortage.

THE HUMAN ELEMENT OF ROBOTICS

Once businesses rely on automated systems, they must develop the technical skills to keep them up and running. While these jobs require significant training and institutional knowledge transfer, reassigning employees to these higher-level positions not only offers greater responsibility and a more pleasant work environment, it can drastically increase the productivity of each employee.

ACCORDING TO A SURVEY IN THE *2018 MHI ANNUAL REPORT*, OVER **60% OF RESPONDENTS** RATE DEVELOPING SKILLS AMONG EXISTING STAFF AS **SOMEWHAT OR EXTREMELY CHALLENGING.**

Robotics and automation provide a productivity multiplier for each staff member while giving operators the super-human capability that industrial robots deliver. The problem that can emerge is that traditional robotics platforms do not work well for collaborative efforts with human co-workers, nor are they especially easy to program and operate. To address these critical pains, novel products are emerging that do allow for high levels of collaboration between robots and staff while simultaneously reducing the programming effort required.

As the market shifts to fill these gaps, collaborative robots can incorporate redundant vision systems that can enhance safety, allow the robot to not just sense by touch, but to see and anticipate the movements of surrounding objects and people. These steps to improve the safety of robots when working closely with humans mean greater flexibility when deploying robotic solutions, and the cages and protective fencing surrounding industrial robots fall into the past.

On the programming front, look for robotic solutions that are natively programmed in software languages similar to **Python**. From line to line, these read effectively as English and can also make training on the robot operating language easier and faster. This evolution in software combined with fewer proprietary control languages and syntax can enable robot adoption rates to rise and keep pace with market demand.

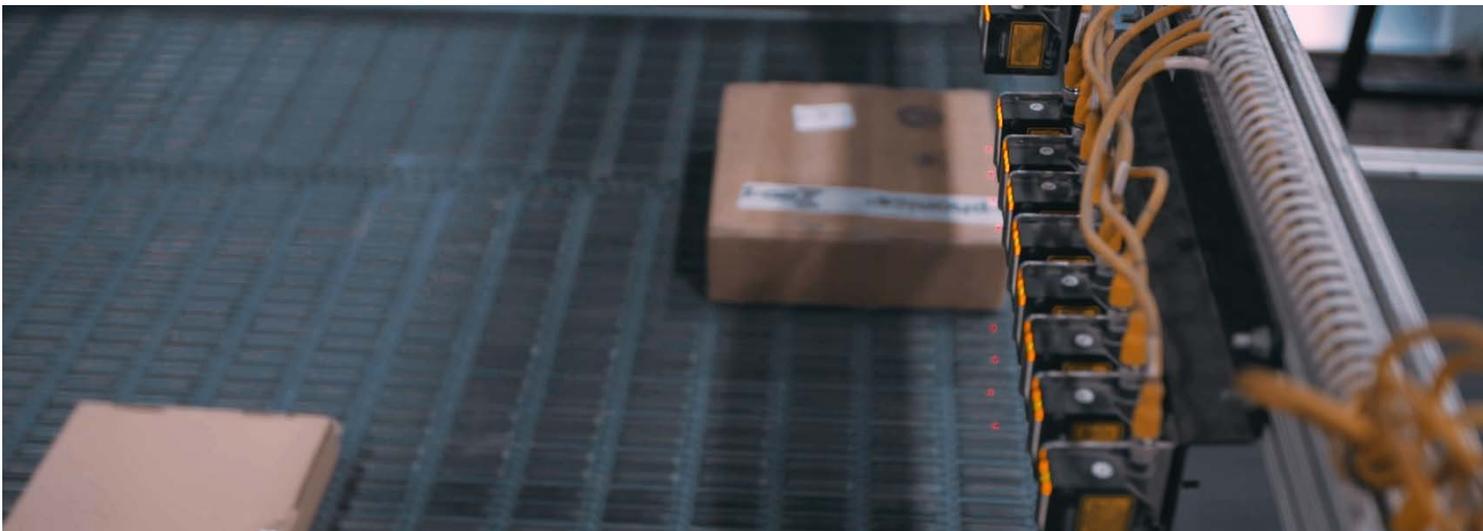
IS “LIGHTS-OUT” COMING SOON?

With enabling technology changes well underway, businesses might wonder how far away a complete, lights-out operation is?

At least five and perhaps closer to 10 years in the future. During that same time span, the labor shortage is expected to become even more dramatic, with **2.4 million jobs estimated to go unfilled in manufacturing alone**. As such, end users are engaging trusted suppliers to leverage the power of the latest robotics technologies to develop new solutions that provide at least partial assistance, if not complete automation, for manual processes that have been longstanding targets for automation.

But there are some present-day milestones. The pop-up facility model offers high levels of automation and flexibility reminiscent of a potential lights-out warehouse. Pop-up facilities are used by parcel carriers to bolster distribution capacity during peak periods, without the full investment of a permanent, fully staffed facility. A pop-up facility can get online in about a month, provides extra cross-docking capacity for a couple months during peak season, then can be decommissioned in around the same time it took to get online. The key to the extra cross-docking capacity in this setup? A fleet of mobile robots.

As online order volumes continue to grow but populations – and associated delivery destinations – move to new areas, the pop-up facility model provides a leaner, more efficient solution for distribution networks to respond. And robotics provide a flexible, on-demand workforce ideal for redeployment and round-the-clock productivity during peak season.



**TRUST THAT
TECHNOLOGY IS BUILT FOR
THE LONG HAUL**

As robotic technology continues to evolve and advance, obsolescence can enter the discussion. While current autonomous mobile robots commonly rely on 2D LiDAR technology, 3D navigation is actively in development and a growing market presence.

Should end users worry about robots they currently have deployed or on order? The short answer is ... no.

Robot performance is not a zero-sum game. The increased performance of new advances does not come at the price of diminishing performance by existing units. Businesses can keep existing systems operating according to original specification, and reap the expanded capabilities made possible by investments in more advanced sensors and processing power.



STARTING DOWN THE ROBOTICS PATH

Getting started requires an understanding of how to harness the key benefits of modern robotic solutions, and then making a plan. Taking a step-by-step approach to automation enables operations to start down the path of exceptional labor efficiency, order accuracy and more – whether a completely lights-out warehouse or not.



Workflow identification: Operations must figure out what tasks are best suited to robotic automation, both immediately and years into the future.



Key performance indicators: Identify the key performance indicators to measure success, like rate requirements and target reductions in manual touches to justify the investment.



System integration: Just as robots can work as part of human teams in collaborative workflows, they also need automated teammates, like conveyor, sortation and other automation to drive results.

CONCLUSION

Whether it ultimately leads to a completely lights-out operation or not, robotics are becoming a fixture in modern distribution centers. And while the **warehouse automation market is expected to nearly double by 2025**, many operations have yet to make their first foray into robotics. The market is beyond the awareness stage, now with an appetite for education on how to translate potential to practical application.