

MATERIAL HANDLING INDUSTRY MAKES THE DIGITAL TRANSFORMATION.

DC Connectivity Helps Keep Pace With E-commerce Trends

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MATERIAL HANDLING INDUSTRY MAKES THE DIGITAL TRANSFORMATION

1

DC connectivity helps keep pace with e-commerce trends.

The material handling industry is in the middle of a historic digital transformation from manual to automated processes in distribution center (DC) and fulfillment operations.

To keep pace with unrelenting e-commerce fulfillment speeds and order volumes, many DC operations have taken significant steps in making the transition to more automated, digital processes. Even with these improvements, many continue to strain under the weight of modern commerce complexities, rising customer service expectations and labor availability challenges.

Automation alone is simply not enough. To unlock the operational intelligence needed to succeed in today's competitive marketplace, DC operators now need to connect these systems via industrial internet of things (IIoT) technologies. This white paper will explore the market conditions driving this digital transformation and examine how fulfillment operations can take the next steps in the digitization process by connecting DC assets, people and processes to address modern commerce challenges.



ESCALATING E-COMMERCE COMPLEXITIES SHAPE THE DISTRIBUTION LANDSCAPE

2

In today's competitive e-commerce and omnichannel environments, rising consumer expectations are pushing traditional distribution and fulfillment models beyond the limits of their capabilities.

E-retail customers not only want fast delivery — including same-day and next-day options — they want it free or at significantly discounted rates.

A successful e-commerce fulfillment model is now a prerequisite for competing in the modern retail market space. More often this means providing customers with a complete omnichannel experience that includes simplified mobile shopping and click-and-collect for the convenience of same-day, curbside pick-up.

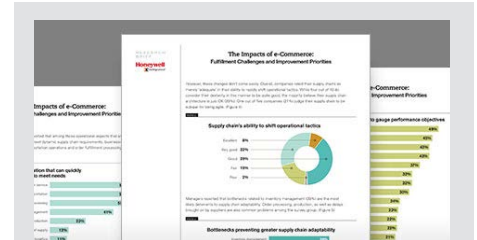
And with annual e-retail distribution volume accelerating at a rate of 25 percent, the current pace of change shows no signs of slowing down (see sidebar for more e-commerce trends).¹

The engines powering this e-commerce revolution are the distribution and fulfillment centers responsible for managing the influx of orders, SKUs and seasonal inventory changes. While many traditional DCs have upgraded their systems and automated their facilities to address these challenges, to varying degrees, they are still dependent on the effectiveness of their DC workforce.²

This presents a paradox for DC operators, who have discovered that simply adding more labor is not a viable long-term strategy. In addition to the changing workforce demographics and rising labor costs, industry growth outpaces the labor pool by a ratio of six to one.² And when you consider that 60 percent of supply chain jobs require skills which are possessed by only 20 percent of the workforce, it's evident that maintaining a staff of qualified employees is essential to achieving consistent DC productivity.







Most facilities are running multiple shifts to keep up with demand, making the goals of increasing reliability and limiting downtime more critical than ever. While there is less time for preventative maintenance activities (or scheduled downtime), DC operators are also finding it more difficult to find qualified labor for their maintenance crews. These trends highlight the growing need for predictive maintenance utilizing condition-based models — even empowering systems to perform their own self-diagnosis. All of which support ongoing efforts to trim capital expenditures associated with maintenance budgets, minimize the costs of downtime, and extract the greatest possible potential out of existing facilities and systems.

The reality is most DCs are ill-equipped to address this increasingly complex e-retail environment. Just as DCs are reaching the limits of their capabilities, tomorrow's fulfillment requirements will push systems and workers beyond their current capacities. To keep pace, e-retailers must quickly adopt new strategies that also maximize the potential of automation systems through connected IIoT technologies that are now readily available in the DC.



The Pace of Change

The steady increase in e-commerce adoption is placing unprecedented demands on distribution and fulfillment operations.

- U.S. online retail grew faster in 2017 than it has since 2011³. 
- E-commerce and e-retail distribution volume is accelerating 25 percent annually¹. 
- Industry growth outpaces the labor pool by a ratio of six to one². 
- 60 percent of supply chain jobs require skills which only 20 percent of the workforce possess². 
- 50 percent of consumers will not repeat business after a negative experience⁴. 
- 73 percent of consumers promise repeat business after a positive delivery⁴. 

Fulfilling the next generation of e-commerce expectations will require greater DC connectivity and automation.

ENABLING THE DIGITIZATION OF THE DC

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The concept of integrating greater degrees of automation in DC operations is not novel to the material handling industry – as is evidenced by the wide assortment of picking, inventory management, goods-to-operator, palletizing and robotic technologies currently in use.

Most recently, leaders in the e-fulfillment space are seeking to build upon the deployment of these technologies through greater DC digitization and connectivity via concepts often referred to as *the digital transformation* and *the industrial internet of things*.

Companies in this competitive market space are recognizing the urgency of embarking on this technological journey – in essence, making the transitions from manual to automated processes; from separate islands of automation to fully connected machines, assets and systems; from disparate to connected workers; and from localized to enterprise-wide visibility to all fulfillment activities.

It's important to keep in mind that this digital transformation does not necessarily need to be all-encompassing or happen all at once. For many companies, this may be a process that lasts for several years (or even decades) and will likely start by addressing today's service level challenges and allowing them to do more – and faster in the critical areas that are currently holding them back. Once operators have experienced the potential for DC connectivity in one area, they're more likely to expand these capabilities across their broader operations.

The technologies needed to make this important transition are now available and include:

- Machine-level, communicating sensors
- Connected devices for workers
- Material handling equipment integration
- Advanced robotics and automation systems
- Cloud data storage and powerful analytics
- Machine learning for ongoing operation improvements
- Intuitive, remote system management apps for DC operators

DC CONNECTIVITY USE CASES

4

The digitization of the DC is allowing companies to capitalize on information from every aspect of their operations – from individual processes and discrete DCs through the entire fulfillment network – while laying a foundation for sustained growth. In doing so, companies are achieving higher levels of reliability, utilization and productivity from both their assets and workers at reduced costs. Consider the following examples.

Increase DC Reliability

Equipment reliability is the key to maintaining consistent system uptime. By connecting equipment and asset sensors to the cloud, DC operators can systematically improve equipment reliability and reduce unplanned outages.

Most traditional DCs utilize calendar-based maintenance programs, where material handling equipment and systems are serviced via pre-defined intervals of time, regardless of the fitness or conditions of the assets. Supporting a program like this requires significant budget allocations for service crews and spare parts inventories.

In a digitally connected DC, where assets can be proactively and continually monitored, operators can reap the financial and operational benefits of a predictive, condition-based maintenance model. Consider the impacts on an average DC (see sidebar):

This example illustrates how a predictive model can net significant annual savings through even marginal increases in uptime and subsequent maintenance spend reductions. From a day-to-day operational perspective, DC asset connectivity allows operators to receive alerts regarding asset performance, especially those which indicate issues that could potentially lead to downtime or underperforming material handling equipment.



- **\$170k annual labor savings** from reducing downtime by **40 percent**



- **\$40k annual maintenance savings** from cutting preventive maintenance spend by **20–35 percent**



- **\$140k annual inventory savings** from a **30 percent** reduction in spare parts and a **20 percent** inventory reduction



- **\$350k annual net benefit**

Improve DC Utilization


Consistent throughput is absolutely essential for distribution and fulfillment operators who are trying to meet profitability targets and customer service level agreements. Enabling connectivity in an average DC can uncover opportunities to greatly improve throughput across all fulfillment activities — and in the process, dramatically increase annual revenue in an average DC.

A connected DC can continuously monitor activities occurring in all fulfillment systems and processes, and notify operators when they are not hitting targeted throughput rates. This technology evaluates trending data to detect when systems are underutilized, uncovering the root causes for inefficiencies and revealing error conditions. This helps operators make the necessary real-time adjustments to remedy these situations. Consider the following scenario:

In a typical facility that operates 5,200 hours per year, processes 300 cases per minute, and earns \$10 in revenue per case, increasing output by 10 cartons per hour delivers the potential for more than \$1M in annual gains:

\$720k in additional throughput revenue

\$330k in recovered labor costs from driving down common error rates



With visibility to fulfillment activities, operators quickly learn how many jams per day are occurring, how long they take to correct, and how much additional runtime is required to meet throughput targets —and take corrective actions. Other common areas where a connected system uncovers utilization improvements include deteriorating key performance indicators and critical path inefficiencies.

Maximize DC Productivity

DC operators know that finding, training and retaining qualified employees are among the most common barriers to consistent productivity. According to the Bureau of Labor Statistics, the estimated annual employee turnover rate in the warehouse sector is 40 percent.

By analyzing labor activity data, a connected DC can detect changes in resource behavior which indicate changes in job satisfaction and an increased probability of leaving. The system examines the large and small changes in performance, time utilization and a host of other metrics to determine the risk of attrition — allowing DC operators to take the necessary steps to retain key employees or proactively replace them to limit production impacts. Consider the financial implications:

An average DC is staffed with 400 direct labor resources across three shifts at a loaded wage of \$15 per hour. Using labor management software, a connected DC is able to process employee performance metrics through machine-learning data models to identify at-risk employees. Operators can then use this data to limit attrition rates — even a 10 percent improvement could save the operation \$420k annually.



CONCLUSION: START BUILDING A CONNECTED FOUNDATION

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Many companies competing in the e-commerce space have reached a tipping point, one where the fulfillment strategies of the past simply can't keep pace with the demands of modern commerce. This paper demonstrates how connecting discrete aspects of DC operations delivers immediate reliability, utilization and productivity gains. But the examples herein are more than just a means of improving bottom line profitability; they are the beginning steps in a larger digital transformation that lay a foundation for greater connectivity and business insights.

Taking these steps now will not only help DC operators address today's fulfillment challenges; it will help e-retailers keep an eye toward a more connected, digital future. The greater the level of connectivity achieved among DC assets, workers and systems, the more potential for leveraging data-driven business insights. And for each day that the system accumulates data, the potential for deeper insights grows. As intelligent machine-learning algorithms are applied to this historic data — detecting patterns of performance and asset fitness in real time — DC operators will have access to a robust toolset for holistic management of all fulfillment activities.

Honeywell Intelligated

+1 866.936.7300

info@intelligated.com

www.intelligated.com

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