

Warehouse Digitization is the future of Warehousing

A comprehensive analysis of different warehouse technologies that, we believe will impact the future of warehousing.



proVision
Warehouse Management Systems

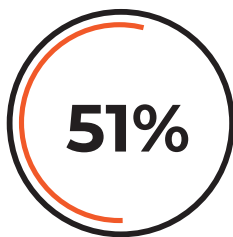
By Ahearn & Soper Inc.

Market Situation

The market has been experiencing a transition from brick-and-mortar to e-commerce. By looking at the success of one of the biggest e-commerce platforms Amazon, the future of the market is likely to shift to platforms that are easily accessible and open 24/7/365 days a year. This market transition presents an opportunity for the warehouse industry to grow. E-commerce requires an average of three times the size of the distribution space to operate, according to PROLOGIS. A real estate investment trust.

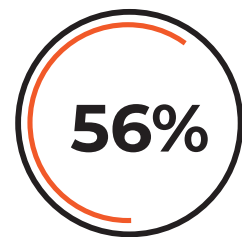
Although, this opportunity is met with a challenge for the warehouse. E-commerce demands fulfillment that is more accurate, faster, and lower cost than traditional retail. These are the qualities that have led e-commerce to its success in the market space we have today.

CUSTOMER DEMANDS LOWER COSTS



Percentage of respondents who categorized customer demands for lower costs as very or extremely challenging.

HIRING AND RETAINING QUALIFIED WORKERS



Percentage of respondents who categorized hiring and retaining qualified workers as very or extremely challenging.

Source: MHI Industry report 2022

These scenarios are prompting warehouses to find alternative and innovative solutions that will allow them to fulfill orders efficiently while factoring in cost-effectiveness, much like every other industry lately. The solution that warehouses should invest in is technology.

The Era Of Warehouse Digitization

Technology is an effective, sustainable, and cost-effective solution to address the challenges of the warehouse. The implementation of technology will move warehousing from relying too heavily on costly human labor to a more automated and tech-focused operation, this is “Warehouse Digitalization.”

Warehouse Digitalization is a transition that will span far more than just management systems and barcode scanners. This evolution is aiming to achieve an almost automated warehouse that can run 24/7/365.

The reason for this is that now, orders can be sent at any time of day throughout the whole year. Customers are also expecting their packages to be delivered on time and as soon as possible.

Some of these technologies include the internet of things, business intelligence, predictive analytics, robotics, automation, automated guided vehicles (AGV), mobile and wearable technologies, and artificial intelligence.



Warehouse Technology Summary

- **Internet Of Things**

A network of interconnected objects that can capture and exchange warehouse data in real-time.

- **Warehouse Management System (WMS)**

A fully optimized WMS can enhance a business's productivity, boost efficiency, and lower costs by digitizing its processes.

- **Business Intelligence And Predictive Analysis**

Technologies that organize data into easy-to-understand reports and dashboards. It also analyzes the data to determine patterns and trends to predict possible outcomes.

- **Robotics And Automation**

The design, construction, operation, and use of robotics and machines to automate warehouse operations.

- **Automated Guided Vehicles (AGV)**

Autonomous vehicles can navigate themselves and/or move cargo through the warehouse using floor markers, wires, lasers, or computer vision.

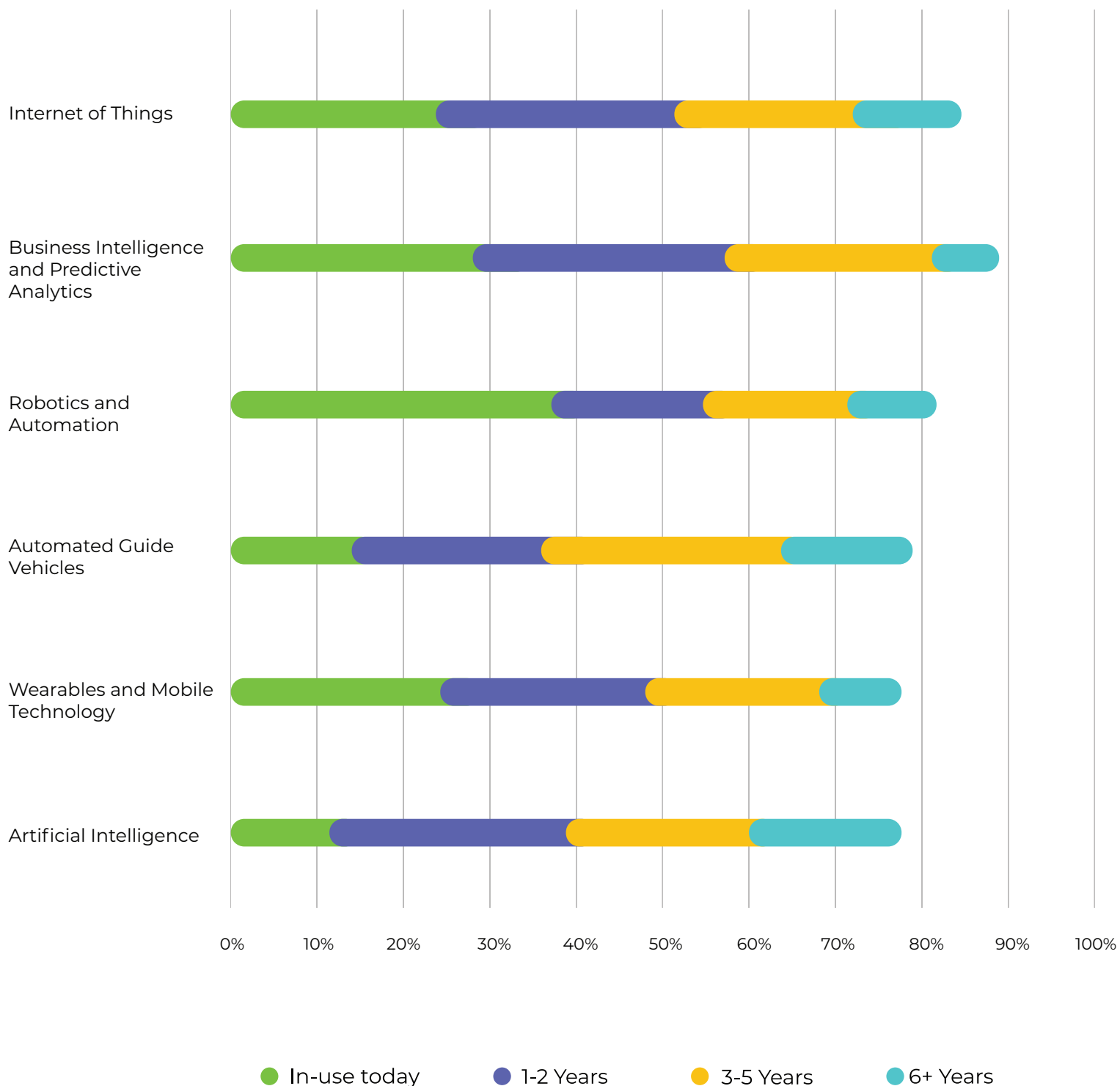
- **Wearables And Mobile Technology**

Small computing devices that are worn or carried by a user to conveniently send and receive information anywhere in the warehouse.

- **Artificial Intelligence**

A technology that enables machines to perform human-like tasks, such as decision-making, speech recognition, spatial awareness, and visual perception.

Adoption Rates Of Technologies In The Supply Chain Industry



Real-Time Data Gathering

The warehouse and supply chain systems of the future will be anything but opaque. Blockchain has the potential to play a pivotal role in achieving transparency at every level. This technology has the power to distribute information fast and securely, thus making real-time data exchange for warehouses efficient and transparent.

Blockchain is incomplete without a key technology: The internet of things (IoT). IoT is an ecosystem of sensory devices (e.g., for location, humidity, temperature) that are interconnected across digital networks. These can collect and transmit data in real time without human intervention.

Essential Elements To Deploying IoT In A Warehouse

Equipment

The first thing you must understand is what exactly you are trying to measure and/or detect and then consider factors such as IT infrastructure, systems, and implementation/maintenance costs. The basis of IoT in a warehouse is sensors and actuators in objects and devices.

Below is a short list of what you might consider adopting:

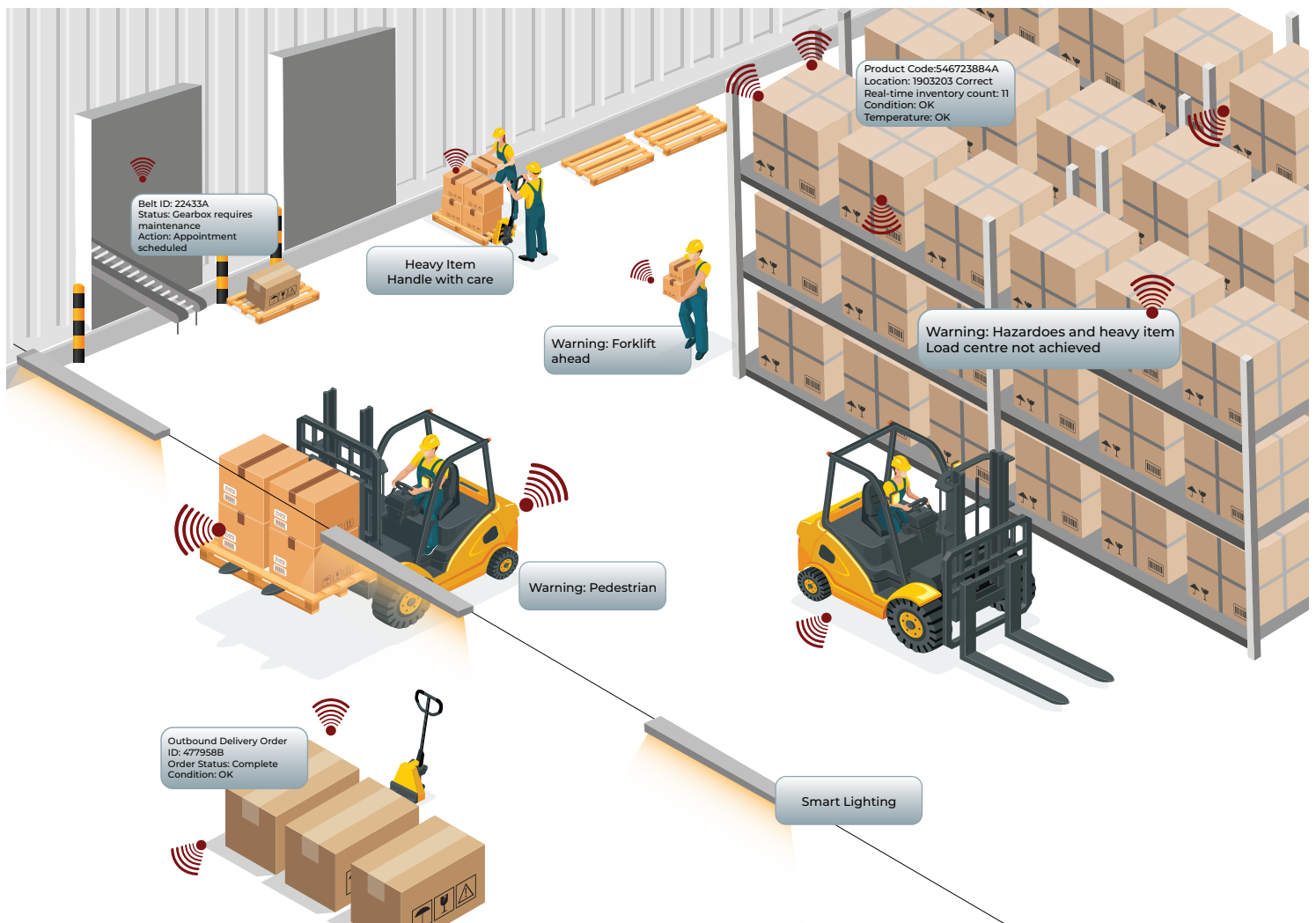
- RFID tags on parcels and pallets to track cargo efficiently and effectively in the warehouse.
- Barcode scanners with RFID capabilities to quickly find packages in crowded areas.
- Temperature and humidity sensors in cold chain facilities to track real-time temp and humidity.

- GPS, motion, and speed detectors embedded in wearable devices to detect operational inefficiencies.
- Rugged tablets
- Mobile computers
- Industrial smartphones
- Wearable devices such as smart glasses

Not only can these sensors help streamline and direct movement and operations, but they can also help collect invaluable data that can later be used to detect inefficiencies and increase productivity.

Network

The power of the internet of things lies in its potential to be the internet of everything, meaning its ability to interconnect devices, people, and objects. If this is to become a reality, IoT and all its components depend on reliable network infrastructure.



To interconnect all IoT endpoints, you need a well-designed and implemented wired and wireless network that reliably and securely transmits communications across the entire IoT ecosystem.

Security

Due to the amount of information that is collected within a warehouse IoT ecosystem, it is important to carefully consider the security side of the equation.

Why? Because failing to do so can result in the leak of not only sensitive customer information but also specific operational processes and procedures that provide your business with a competitive advantage. To prevent this, it is extremely important that the following questions are carefully considered during the planning and deployment phases of a warehouse IoT implementation.

Authentication

How will you control what devices can connect and participate in the IoT ecosystem?

Data Integrity

How is data going to be protected while in transit? (Moving between endpoints and the database)

Authorization

What data repository can guarantee that only the right people and systems have the access to write and read data?

Who will be responsible for monitoring the security of the IoT ecosystem and conducting system maintenance to address and correct system vulnerability?



IoT Platform

An IoT platform/ecosystem is a complex organization of interconnected devices that spans across sensors, devices, software, equipment, security, servers, and databases to mention a few. There are many components required to interact reliably and securely. Most companies depend on what is known as an IoT platform to achieve this purpose.

An IoT platform is simply a middleware, mostly cloud-based, used to interconnect all the pieces of the IoT ecosystem. Think of it as the threads that connect all the parts within the ecosystem and store, process, and analyze all generated data. Most businesses will leverage an established third-party IoT platform.

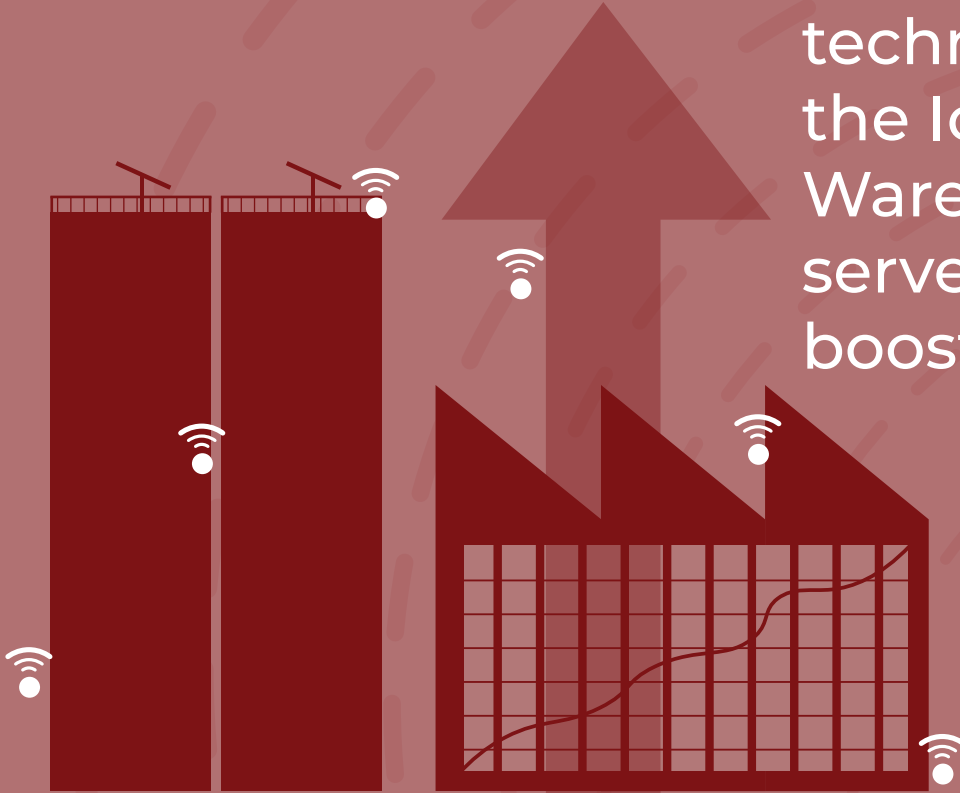
Analytics

Along with choosing a suitable platform for IoT in the warehouse, you will also need to investigate IoT analytics capabilities. IoT analytics means the application of data analytics tools and methods to analyze and make sense of large volumes of data.

Sensory devices will be collecting data in real-time, here lies the power of IoT in warehouse and distribution center operations.

Down the line, IoT analytics is the very tool that will help you drive efficiency and profitability by understanding in detail operational inefficiencies and effective solutions that will yield tangible operational efficiencies.

“Leveraging the latest supply chain technology and the IoT, the Smart Warehouse can serve as a hub to boost efficiency.”



Source: Creating a Smart Warehouse with the Internet of things, Samsung Insights, 2016.

INSIGHTS
insights.samsung.com

Creating a smart warehouse with IoT is no longer hype. This technology is already making inroads in many warehouses and distribution centers across the world.

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