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Cloud inventory
KEY TO INDUSTRY 4.0

Supply chain, product demand, and worker shortage all prompt the implementation of Industry 4.0 philosophies which automate time intensive, manual work to ensure that people have information to maximize their decision-making capabilities. Moving inventory management from paper, tape measures and spreadsheets to sensors and custom inventory software provides a great example of Industry 4.0 automation.

Cloud Inventory Key to Industry 4.0 Success

A storm of challenges face organizations including the strain of product demand, limited supply chain resources, and an unprecedented exodus of people leaving the workforce.

Industry 4.0 technology and systems provide some relief.

Industry 4.0 is a system that combines informational and operational technology to make manufacturing more aware, predictive, and autonomous. Employees operating in a 4.0 environment are highly connected with a more complete view of their business ecosystem.

"Ultimately, you want to run autonomously in a closed-loop system where humans set parameters, but technology runs itself," said Chris Hill, Technology Program Director at Iowa State University Center for Industrial Research and Service. "Sensors and software directly feed an Industry 4.0 environment. They replace a physical process and feed information back to people."

Hill said he still sees employees manually measure material. They write data on paper and hand it to someone else who enters it into a spreadsheet.

"We're seeing that people want more meaningful work. It's a high priority," Hill said. "With technology, we can re-evaluate work, take it out of the hard, physical realm and make it more value-added."

One way Hill's research center identifies opportunities is with wearable sensors tracking employee movement. Managers can look at data and pinpoint times that employees engage in extra activity—like climbing ladders—throughout a shift.

In the numbers

- According to Fortune Business Insights, globally, Industry 4.0 market size was valued at $114.5 billion in 2021. That market is projected to grow to $377.3 billion by 2029 increasing by 16.3 percent during that period. The numbers were derived by looking at product offerings like sensors, software, robotics, PLC automation, control room solutions, motors, generators, and others.
- Product demand has strained bulk material markets including global dry bulk according to a 2021 global market report by Research and Markets.com. Growth is mainly due to companies recovering from COVID-19. The report showed global dry bulk materials market will grow from $306.5 billion in 2021 to $389.4 billion in 2025. That represents a 6.2 percent compound annual growth rate CAGR).
- According to Yahoo Finance, supply chain disruptions are increasing due to consumer demand, labor shortages, and trucking and shipping capacity restraints. More than 70 percent of retailers said supply chain disruptions negatively impacting business. That is a 42 percent increase from a year before.
- About 36 percent of U.S. adults don't have jobs and they are not looking for work. The U.S. has more than 3 million fewer Americans participating in the labor force compared to February 2020, according to the US Chamber.

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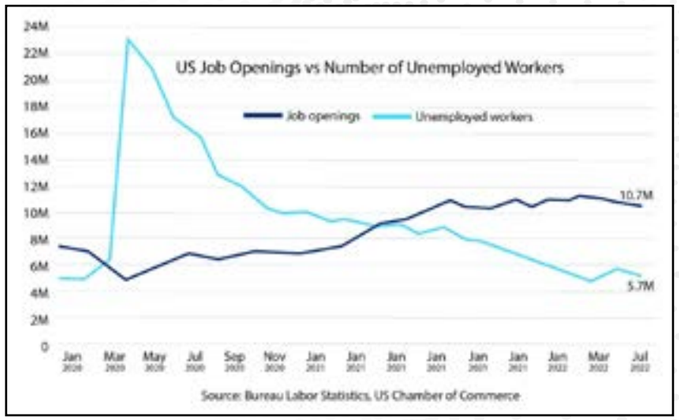
POTENTIAL OF AUTOMATION IN EASING WORKFORCE SHORTAGES

Work Activity	Time Spend Across Occupations	Automation Potential
Managing & developing people	7%	9%
Applying expertise to decisions, plans & creative tasks	14%	18%
Interfacing with stakeholders	16%	20%
Performing physical activities & operating machinery in unpredictable environments	12%	26%
Collecting data	16%	69%
Processing data	16%	69%
Performing physical activities & operating machinery in predictable environments	18%	81%

Source: McKinsey Global Institute –https://mck.co/3QepsPg



- Labor shortage is not unique to the U.S. As of early 2022, Europe struggled to fill 1.2 million open job roles. Australia had 400,000 vacant positions and Singapore reported 163 jobs for every 100 available workers.

Taking baby steps toward automation

Engineers utilize finite element analysis to break down engineering and mathematical modeling. Those implementing Industry 4.0 can do the same by breaking processes down to smaller steps and watching for automation opportunities along the way, Hill said.

He said supply chain analysis has shown the need for more dynamic material ordering and storage. Decision makers often navigate long lead times to receive material, but more and more are looking to identify substitute material.

Unleashing communication between locations

No matter where people are located, employees can share data via cloud-based reports. Sensors and software, for example, gather inventory data and prepare it for customer service, purchasing, compliance, production, and Enterprise Resource Planning.

"We're finding that more and more, large companies have centralized decision-making, especially purchasing and operations," said Mike Mossage, Vice President - Regional Sales & 3D Product Specialist for BinMaster. "We've invested a lot of resources to our BinCloud-based reporting."

"Customers today expect companies to bring bin, tank, and silo inventory to cell phones," Mossage said. "People demand mobility. Inventory software releases new features at almost double the rate of Apple operating systems."

Sharing data, a team can identify bottlenecks, trends, and opportunities. Even maintenance can use data to facilitate predictive maintenance reducing downtime. History found on these cloud reports can help with predictive models and condition-based alerts. Sensor data is used to track equipment, improve work process, streamline supply chains, increase safety, and bring higher overall efficiency.

Inventory of Things (Io T)

Level sensors and software fits into the category of Internet of Things (IoT).

- Provide insights for data-driven decisions to increase efficiency and drive down costs
- Shorten lead times for production
- Reduce carrying costs and last-minute purchases
- Reduce waste on bulk inventory that could spoil
- Accurate inventory feed data to Enterprise Resource Planning systems
- Streamline transportation and timely ordering

From a business standpoint, inventory management streamlines bulk material handling for inventory balancing, planning and control. For balance, it's important to have the right amount of inventory to fulfill production and free up money tied to safety stock. Control refers to managing the physical and logistics of inventory.

Level sensors begin the process of real-time inventory measurements. Non-contact technologies, such as radar and laser, update quickly for continuous inventory monitoring. Cloud software organizes and presents data to provide key performance indicators (KPI) to meet business objectives.

"It's essential to tailor sensor and software technology to each industry so that managers can maximize their decisions," said Scott Hudson, BinMaster Vice President and Sales. "We realize that different materials require different sensors and software which account for workplace conditions, company goals, and even the bulk density of the product."

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BinMaster developed Industry 4.0 tools like sensors placed in bins, silos, and tanks. These sensors measure level of material in the vessel eliminating the need for manual measurements. The data is collected into software available to a number of departments and people in an organization for up-to-date, accurate information useful for planning, ordering, production, and maintenance.

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