Leveraging Practical Robotics in Manufacturing and Distribution

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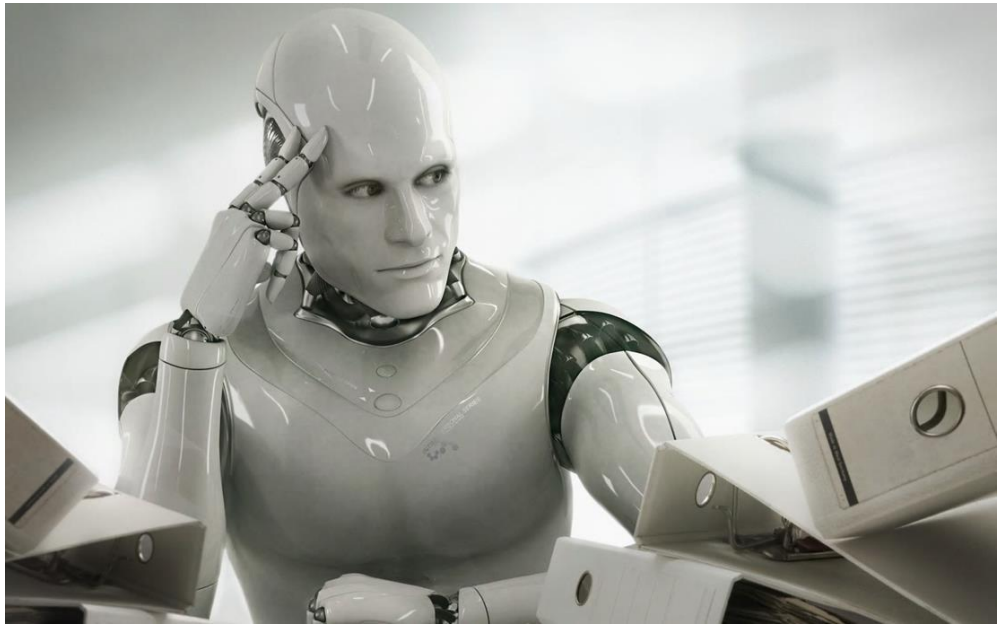
Agenda

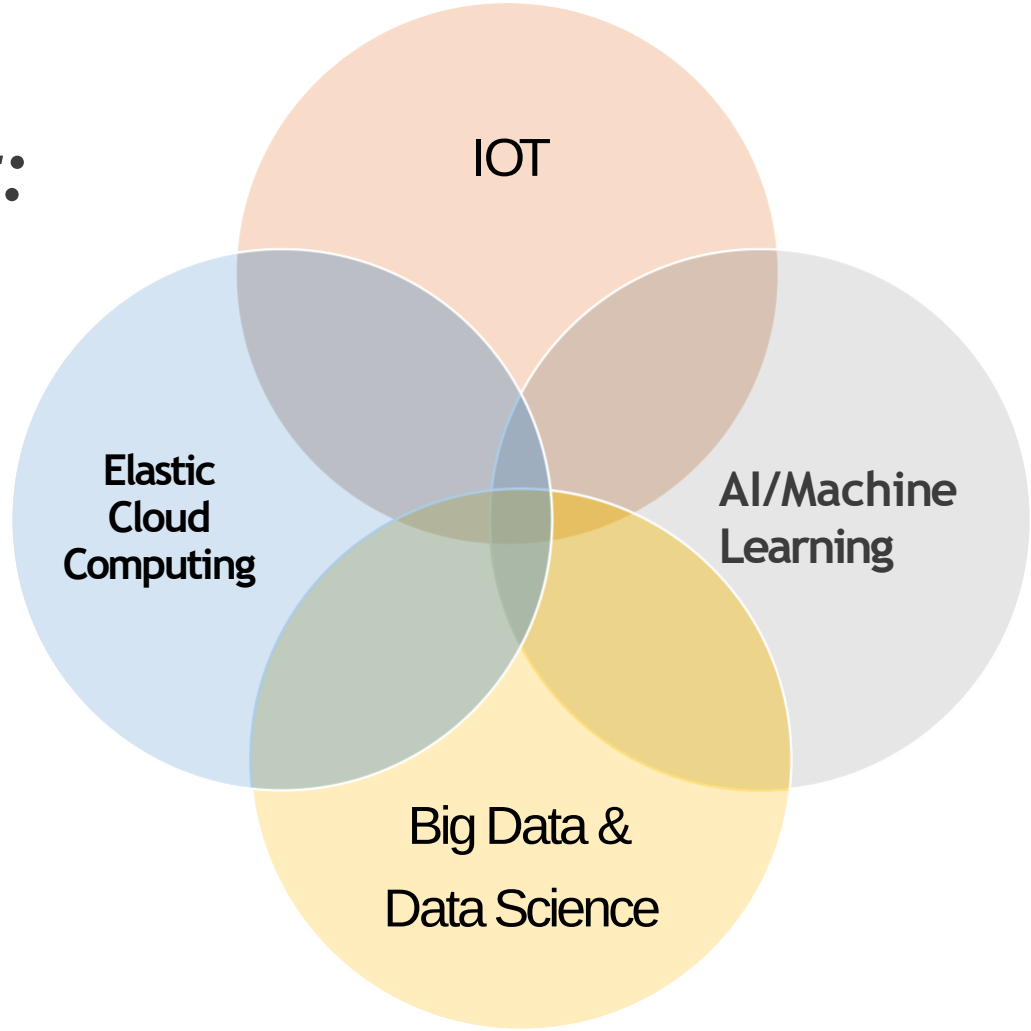
- Introductions
- Today's Questions
  - Digital Transformation?
  - What does the market think?
  - What do we think we know?
  - What is a Robot?
  - What problem are we trying to solve?
  - What are we accustom to?
  - What are the latest?
  - What is Collaborative / Cobot?
  - What’s holding us back?



Digital Transformation

Vital to every Industry and Market:

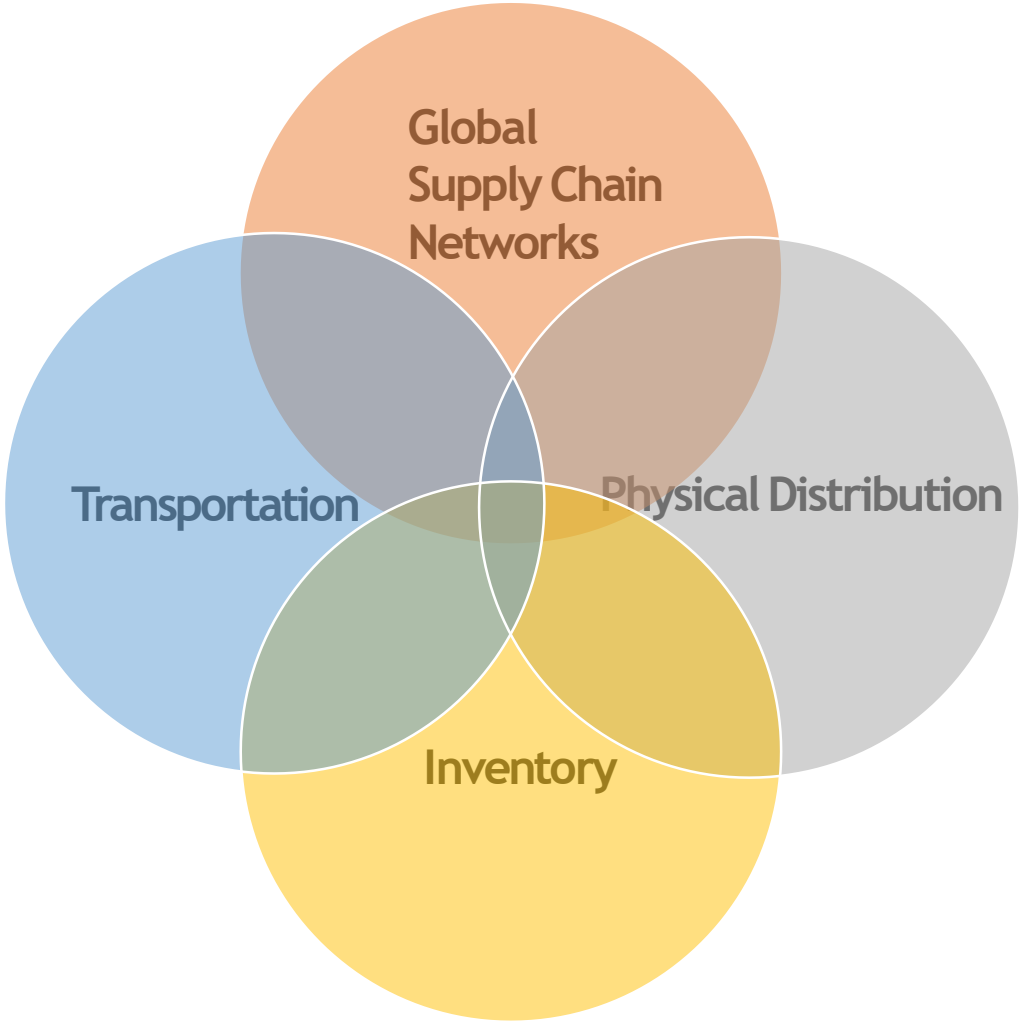
- *Applied to every aspect of the Organization*
- *The utilization of advanced analytics for economic value, agility and speed*



Digital Transformation

Vital to every Industry and Market:

- *Applied to every aspect of the **Manufacturing**, **Distribution** and/or Retail Organization*
- *The utilization of advanced analytics for economic value, agility and speed*



What does the Market Think?

- When asked about current robotics use and whether they will evaluate robotics during the next 24 months, 16% said that they currently use robotics, while 15% are evaluating robotics, for a total of 31% now either using or considering robotics. That's up from last year, when 9% said they use robotics and 13% were considering robotics.

- For applications, using or considering robotics for pick and place or parts transfer climbed by 8% to reach 41%, while using or considering robotics for palletizing declined by 8%. Use or consideration of robotics for pick to cart, order fulfillment (picker to part), truck loading, and transportation also were on the upswing.

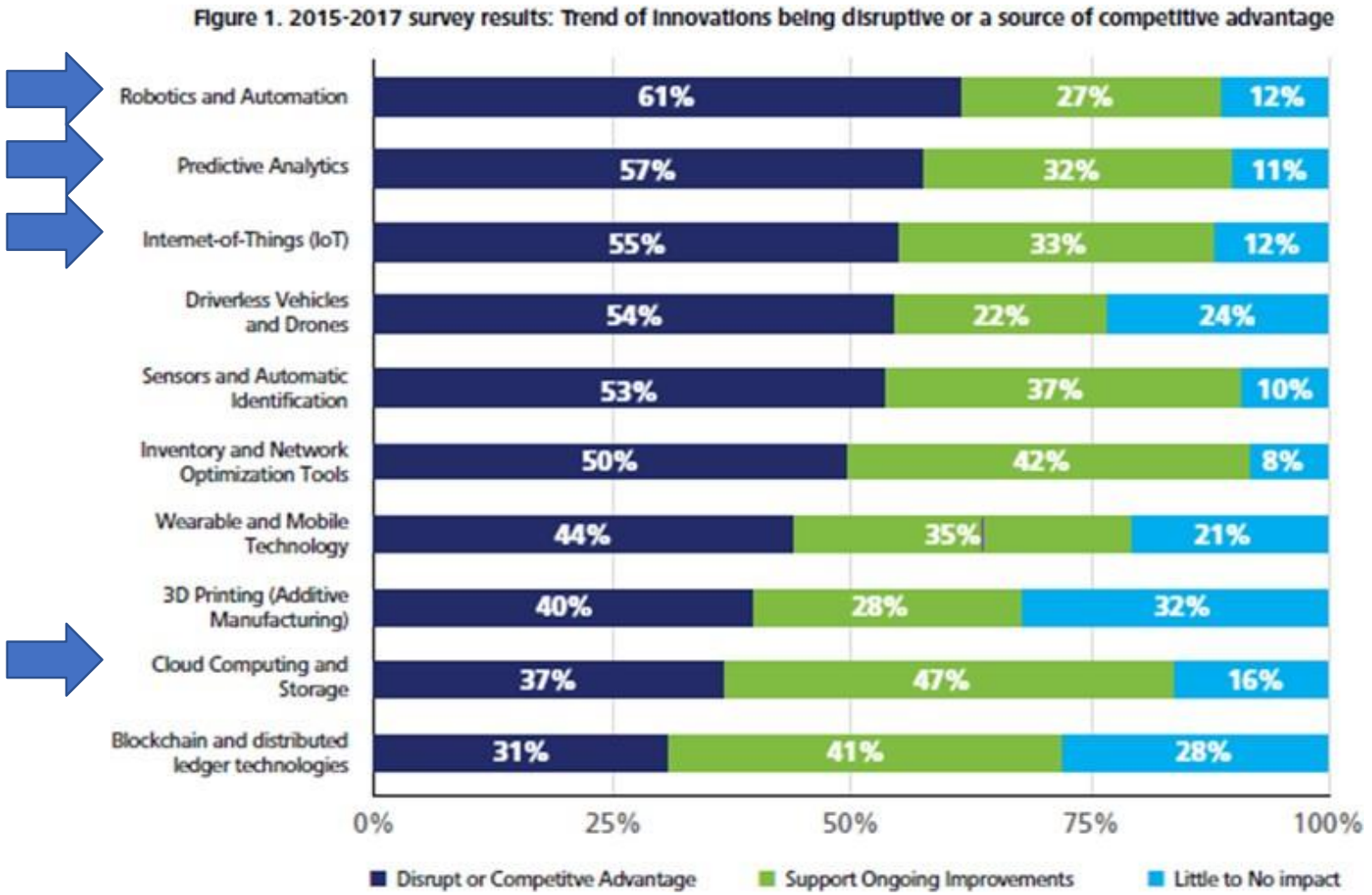
- "Greater functionality with robotics, more flexibility of applications, and lower costs are driving this spike in current usage and evaluation of potential use," .

- "As labor availability becomes tighter and labor costs increase, demand for robotics will increase."

- Spending indications for automated guided vehicles (AGVs) also were up. For 2018, 7% use AGVs, up 1% from last year, while 14% said that they're evaluating the use of AGVs during the net 24 months, which is up 2% from last year.

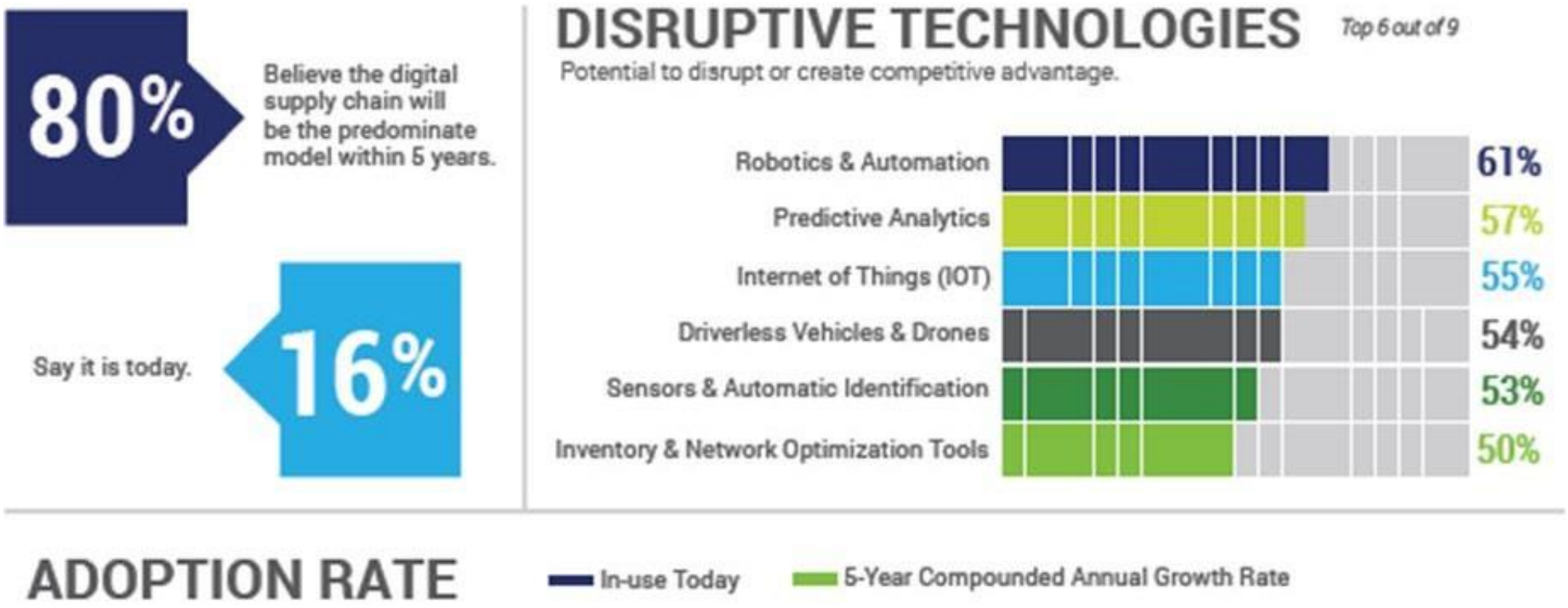
2018 Warehouse/Distribution Center Equipment Survey: Automation & Robotics Lead Robust Outlook (MMH)

What does the Market Say?



2017 MHI Annual Industry Report
Next-Generation Supply Chains:

What does the Market Think?

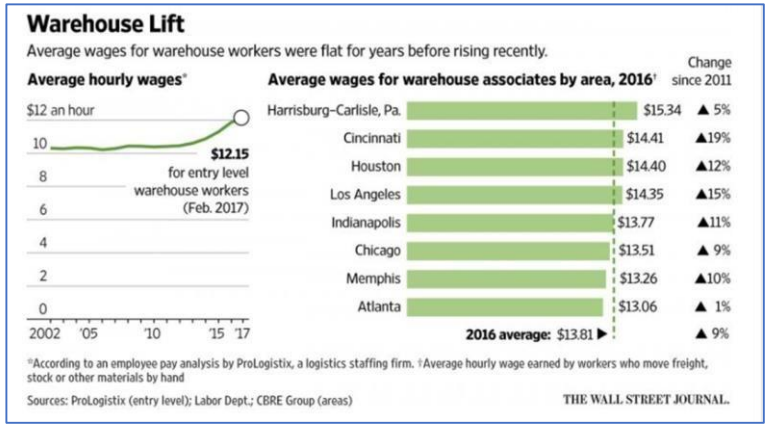


What are we solving for and why?

Labor Shortage

Cost of Space

Cost of Labor

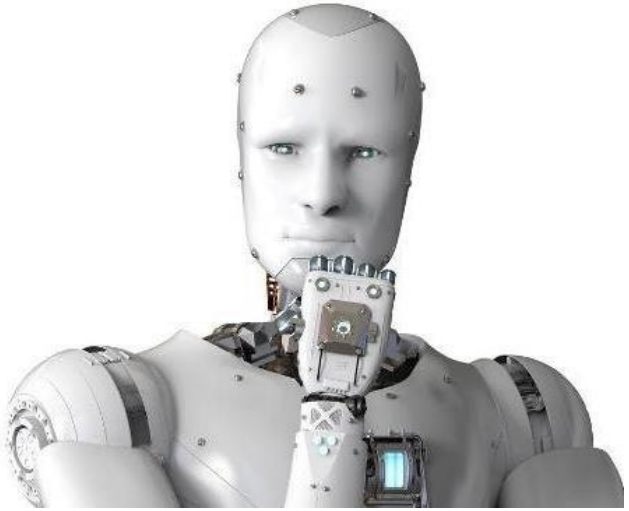


What do we think we know or our bias?

- ✓ They are limited in their application
- ✓ They aren't proven
- ✓ They are too expensive
- ✓ They aren't widely used

What is a robot?

A robot is a machine designed to execute one or more tasks automatically with speed and precision



What are we accustomed too?

Automation Storage and Retrieval

Automated Guided Vehicles (AGVs)

Industrial Robots for Palletizing & Assembly

What are the latest Robot Uses?

- Goods to Person
  - Robots Travel
- Person to Goods
  - Worker & Robots Travel
- Goods to Robot
  - Fixed Robots
- Robots to Goods
  - Mobile Robots

Goods to Person

Products are brought to packer/picker on shelf

Products are brought to packer/picker in tote

Person to Goods

Follow Me

Picker is paced by the bot. Once the pick confirmation is completed the bot automatically moves to the next location that a pick is required.

Follow You

Bot follows picker along predestined pick path. If picker stops bot stops. Picker uses hand held device to guide pick path.

Find Me

Bots are independent of pickers. Pickers travel main aisles in search of Bots positioned at pick location.

What are Collaborative Robots / Cobot?

- A **cobot** or **co-robot** (from **collaborative robot**) is a robot intended to physically interact with humans in a shared workspace. This is in contrast with other robots, designed to operate autonomously or with limited guidance, which is what most industrial robots were up until the decade of the 2010s.
- The Push: Collaborative robotics: Man and Machine working in common space
- Advanced force sensing and vision sensing provides a safe reliable work environment.

Goods to Robots

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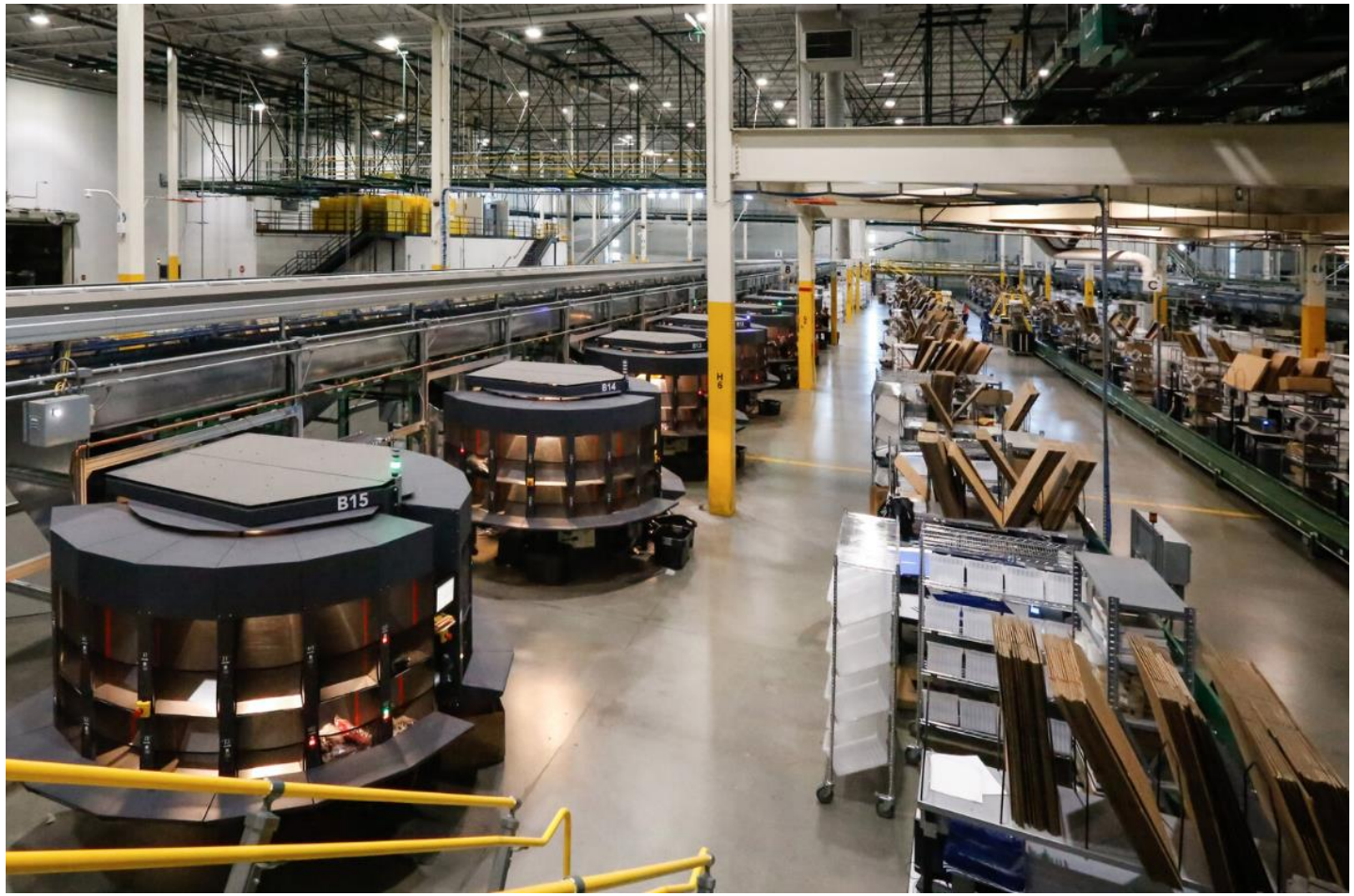
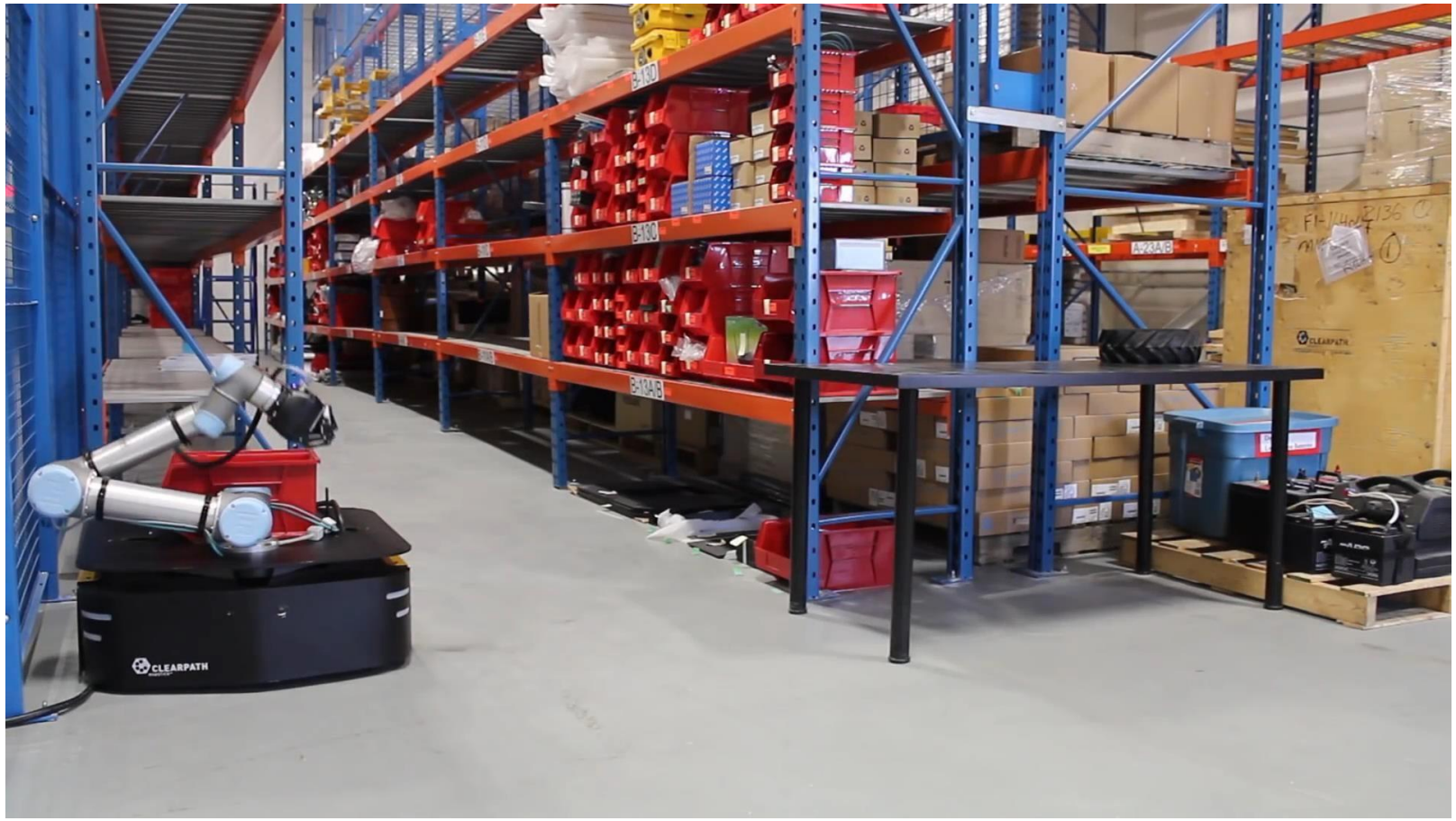


Robots to Goods

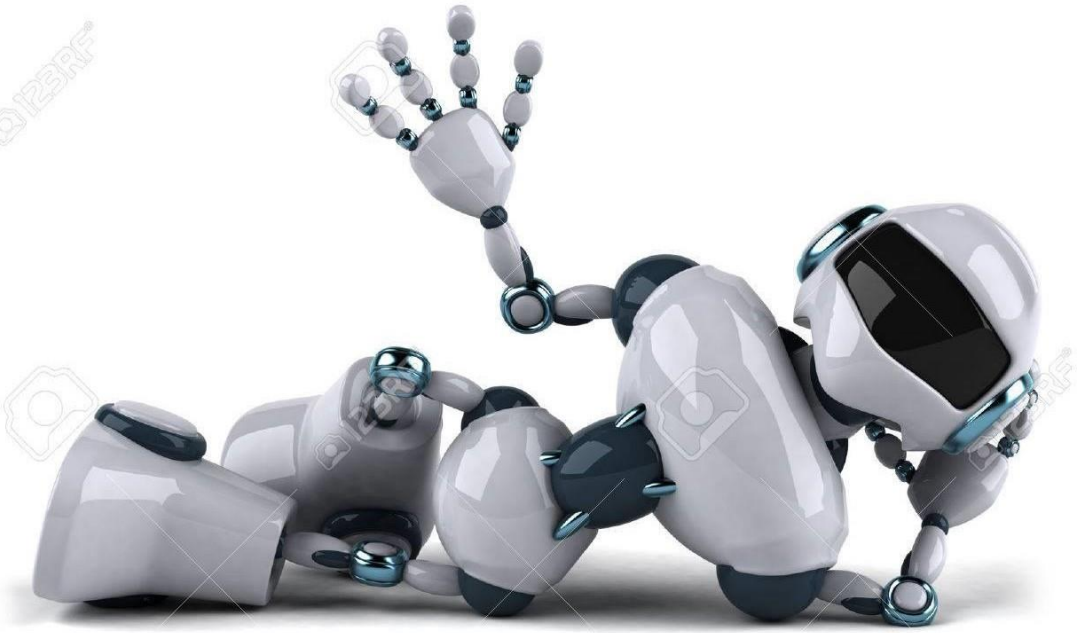
- AGV with Integrated collaborative industrial robot



What's holding us back?

- ✓ Flexibility
- ✓ Cost / PayBack
- ✓ Safety
- ✓ Long Term Maintenance

Questions????



Overview of enVista

- Automation & Engineering firm based in Indianapolis, IN and Robotics Lab in Chicago, IL
  - ~ 50 % Distribution Systems
    - Conveyor & Racking
  - ~ 50 % Robotic Solutions
    - Pick, Pack, and Palletize
      - Food and Medical
  - Design Build Firm
  - Engineering
      - Mechanical,
      - Electrical,
      - Software (WCS and PLC)

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