Collaborative Robots: Re-shaping Manufacturing, Packaging and Distribution

Presented by:

Joe Campbell

MODEX 2020
GEORGIA WORLD CONGRESS CENTER
ATLANTA | MARCH 9-12
MODEXSHOW.COM
powered by MHI

WINDS OF CHANGE IN ROBOTICS

- New Technology
- New Customers
- Accelerated Adoption
- New Market Drivers
- New Channels

THE LABOR SHORTAGE

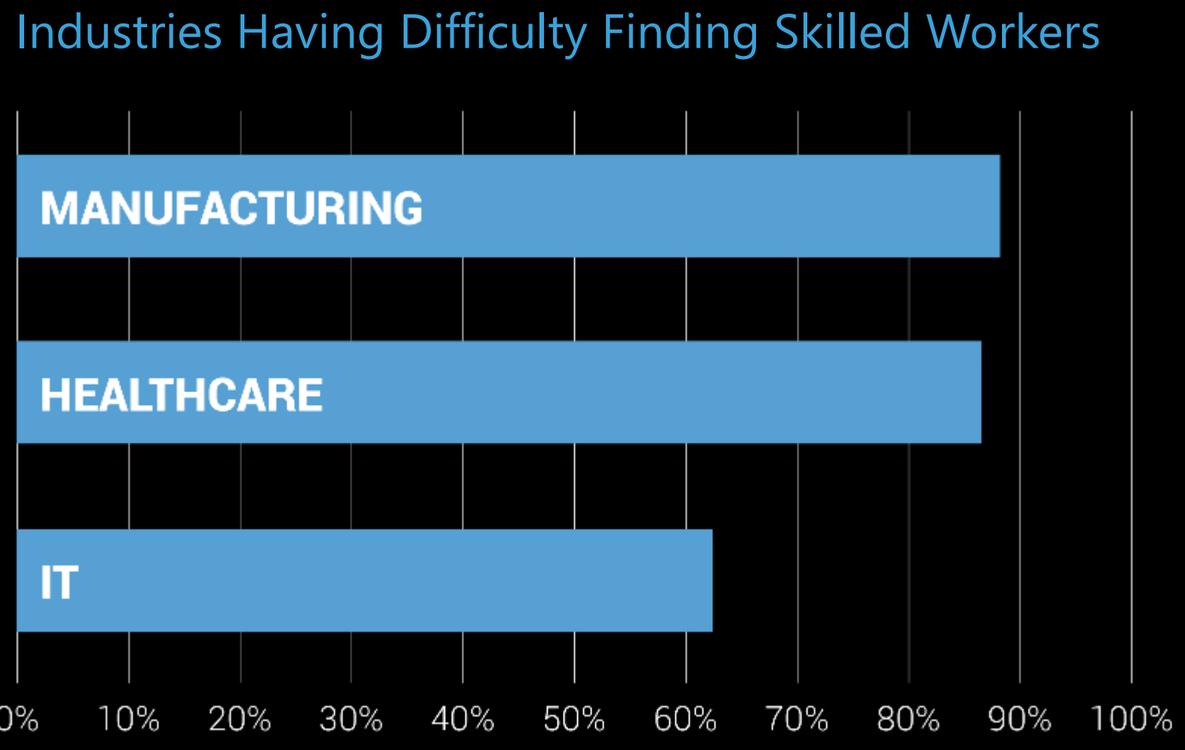
Impossible to hire.
Expensive to train.
Difficult to keep.

UNIVERSAL ROBOTS


MANUFACTURING STAFFING IS NOT A SHORT-TERM ISSUE. IT'S A DEMOGRAPHIC ISSUE.
UNIVERSAL ROBOTS

MANUFACTURING INDUSTRY CHALLENGES

- US experiencing historically low unemployment – 50 year low.
- BLS reports more job openings than people to fill them.
- National Association of Manufacturers (NAM) executive survey says finding skilled workers remains top challenge.
- SME: 89% of manufacturers have difficulty finding qualified workers – highest among major industries.



Sources : Bureau of Labor Statistics, National Association of Manufacturers, Society of Manufacturing Engineers

UNIVERSAL ROBOTS

NATIONAL PROBLEM, REGIONAL VARIATIONS

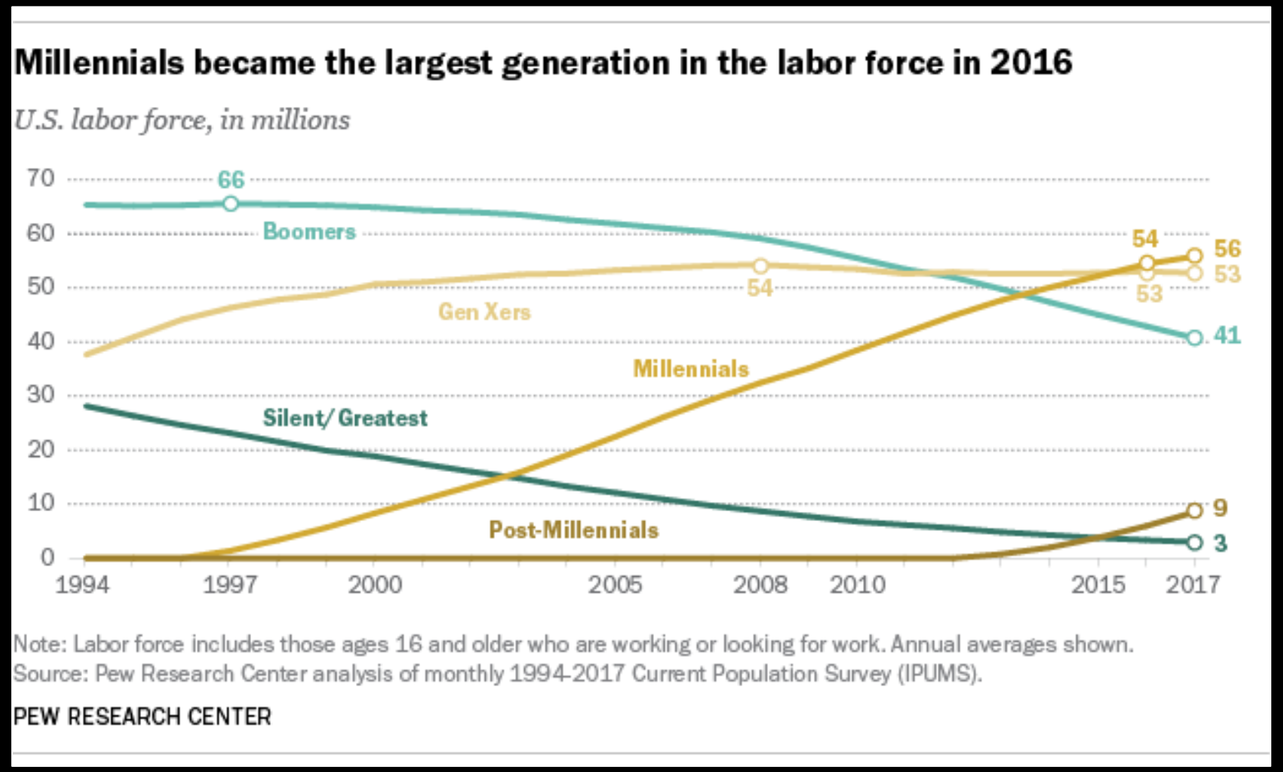
- October unemployment, seasonally adjusted, was 3.6%. Full employment is 4.1% - 4.7%.
- Rates in many rural areas at or below 2% compared to 3.6% countrywide.
- NAM / BLS reports 477,000 unfilled manufacturing jobs at the end of October 2019.
- NAM survey: 28.8% of plants reported turning down new business or additional revenue.

Sources: Bureau of Labor Statistics, National Association of Manufacturers, Federal Reserve,

UNIVERSAL ROBOTS

BOOMERS VS. MILLENNIALS

- 10,000 boomers reach retirement age every day.
- Boomers 55+ years old represent 27% of manufacturing workforce across US.
- Millennials and X'ers not interested in filling manufacturing gaps left by boomers.
- Deloitte study found 83% of US population find manufacturing jobs important to economy, but less than 1/3 would encourage children to pursue jobs in manufacturing.



Sources: Bureau of Labor Statistics, Deloittte, PEW Research Center

UNIVERSAL ROBOTS

2.4M OPEN JOBS BETWEEN 2018-2028

The skills gap may leave an estimated 2.4 million positions unfilled between 2018 and 2028

2.69M jobs open from retirements

1.69M new jobs due to natural growth

4.6M manufacturing jobs to fill from 2018 to 2028

Only **2.2M** jobs are likely to be filled

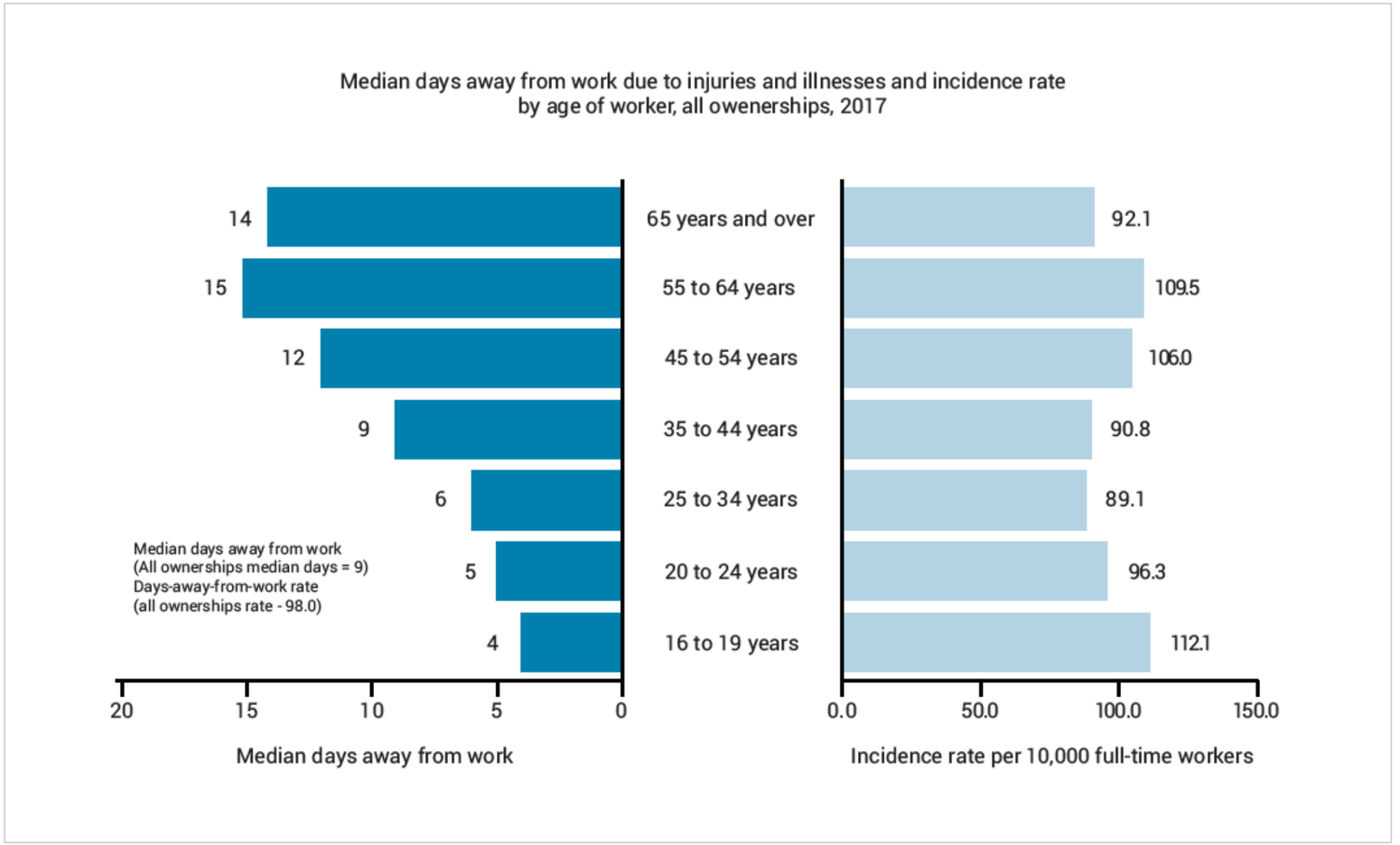
2.4M (53 out of 100) open positions lie vacant du to skills shortage in the U.S. manufacturing industry

Sources: Bureau of Labor Statistics, Manufacturing Institute, Deloitte

UNIVERSAL ROBOTS

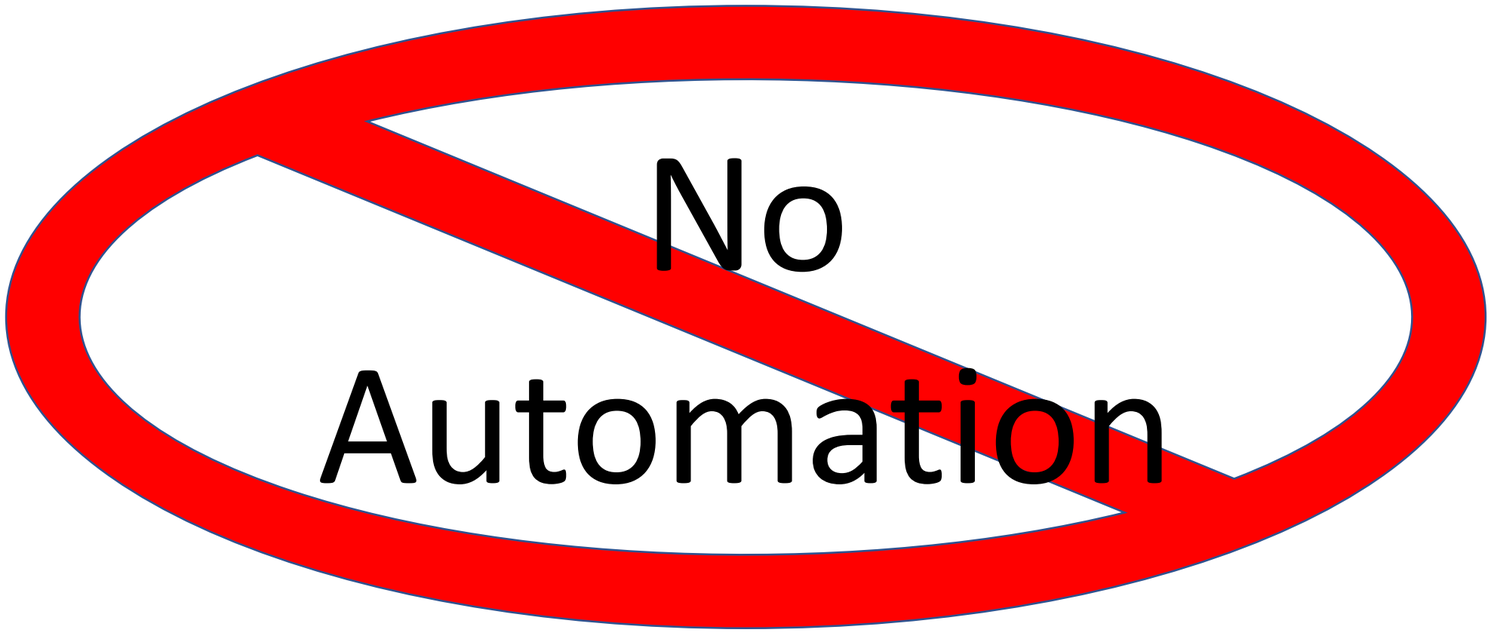
THE IMPACT OF WORKPLACE INJURIES

- 104 million work days lost to injuries and fatalities across all industries in 2017.
- 400,000 man years!
- Manufacturing had 394,600 reported injuries in 2016.



Sources: American Society of Safety Engineers, Bureau of Labor Statistics, National Safety Council

“Do Nothing” is NOT an Option



Traditional Automation

Collaborative Automation

COBOT BASICS

- Collaborative Robot = “Cobot”
- Known for being very safe, able to safely operate alongside humans in shared space.
- No previous coding/robotics/automation experience required.
- “If you can program a smart phone, you can program a UR cobot.”
- Cost 1/3 to 1/2 of traditional automation.
- Economically viable in high mix / low volume operations

INDUSTRIAL ROBOTS

- Difficult set-up
- High programming expertise needed
- Fixed installations
- Extensive space requirements
- Need a safety fence
- Numerous additional costs

VS.

COLLABORATIVE ROBOTS

- Fast set-up
- Anyone can program
- Flexible deployment
- Limited space requirements
- Collaborate side-by-side with humans
- Cost effective with fast payback

UNIVERSAL ROBOTS

TRADITIONAL AUTOMATION – ALL OR NOTHING

- Philosophy rooted in the automotive industry – birthplace of modern robotics.
- Reinforced by strict safety standards and guarding requirements.
- Reinforced by costly and limited floorspace.
- The most demanding 10% of a project can consume 40% of the cost!

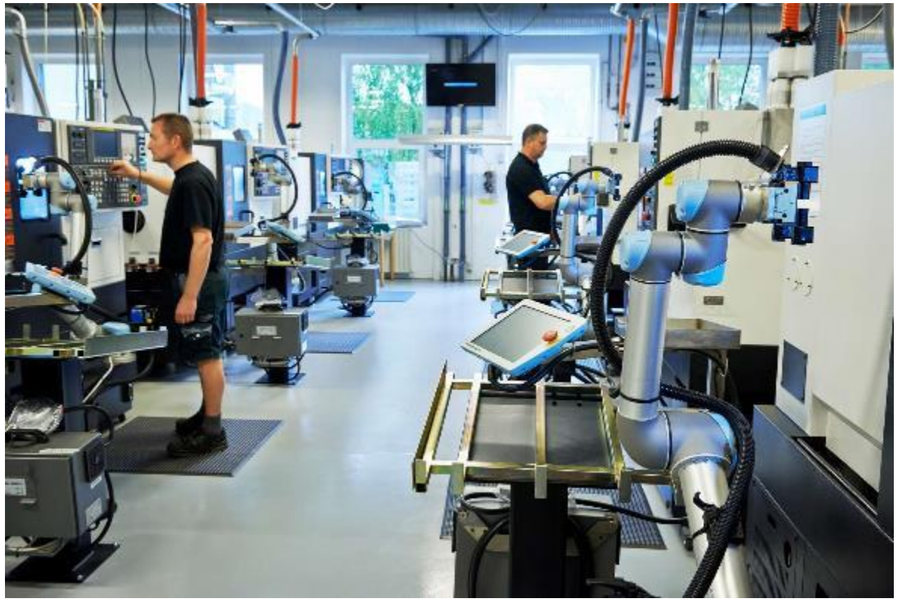
COLLABORATIVE AUTOMATION IS NOT ALL-OR-NOTHING!

- Human-robot collaboration is 85% more productive than humans or robots alone.

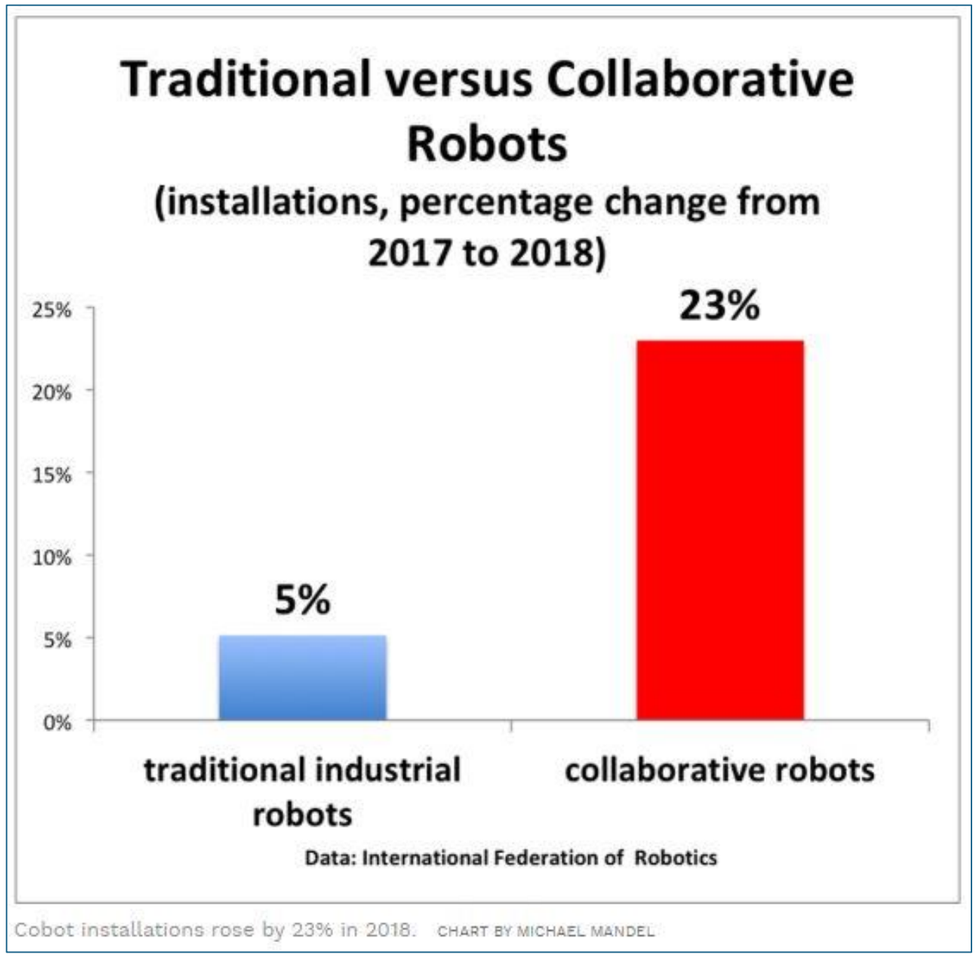
Source: MIT research data on Financial Times article “Meet the cobots: humans and robots together on the factory floor” on May 5, 2016

COLLABORATIVE = INCREMENTAL

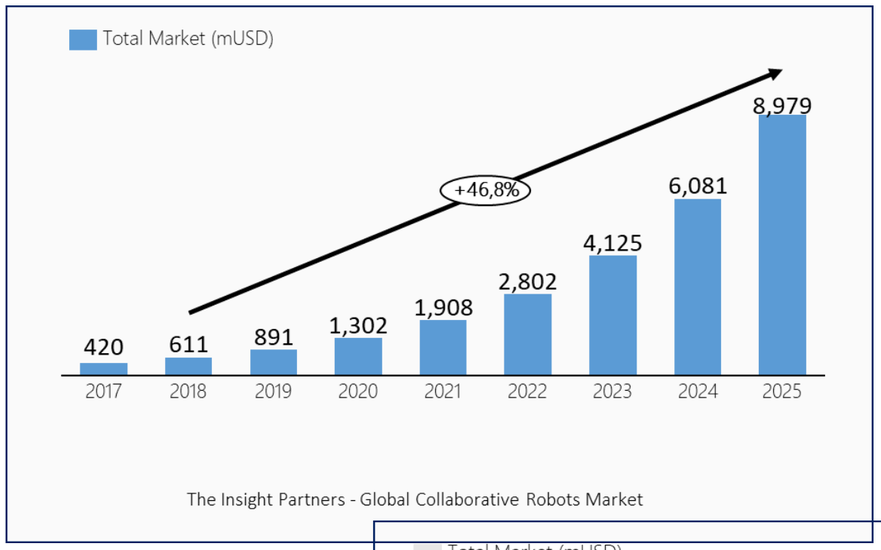
- Automation even a CFO can like!
- Automate 1 process step. Generate ROI. Automate another process step. Generate ROI. Repeat.



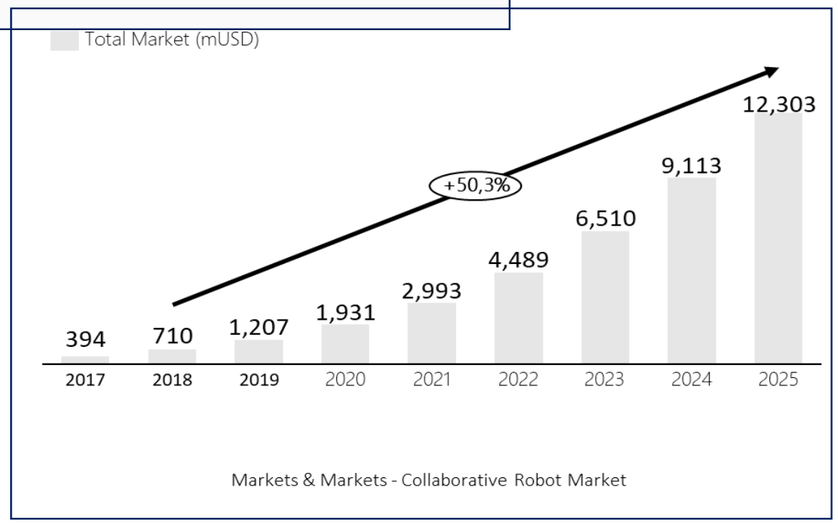
COBOTS: EXPLOSIVE GROWTH



Cobot installations rose by 23% in 2018. CHART BY MICHAEL MANDEL



The Insight Partners - Global Collaborative Robots Market



Markets & Markets - Collaborative Robot Market

COBOTS ARE REACHING NEW CLASSES OF CUSTOMERS

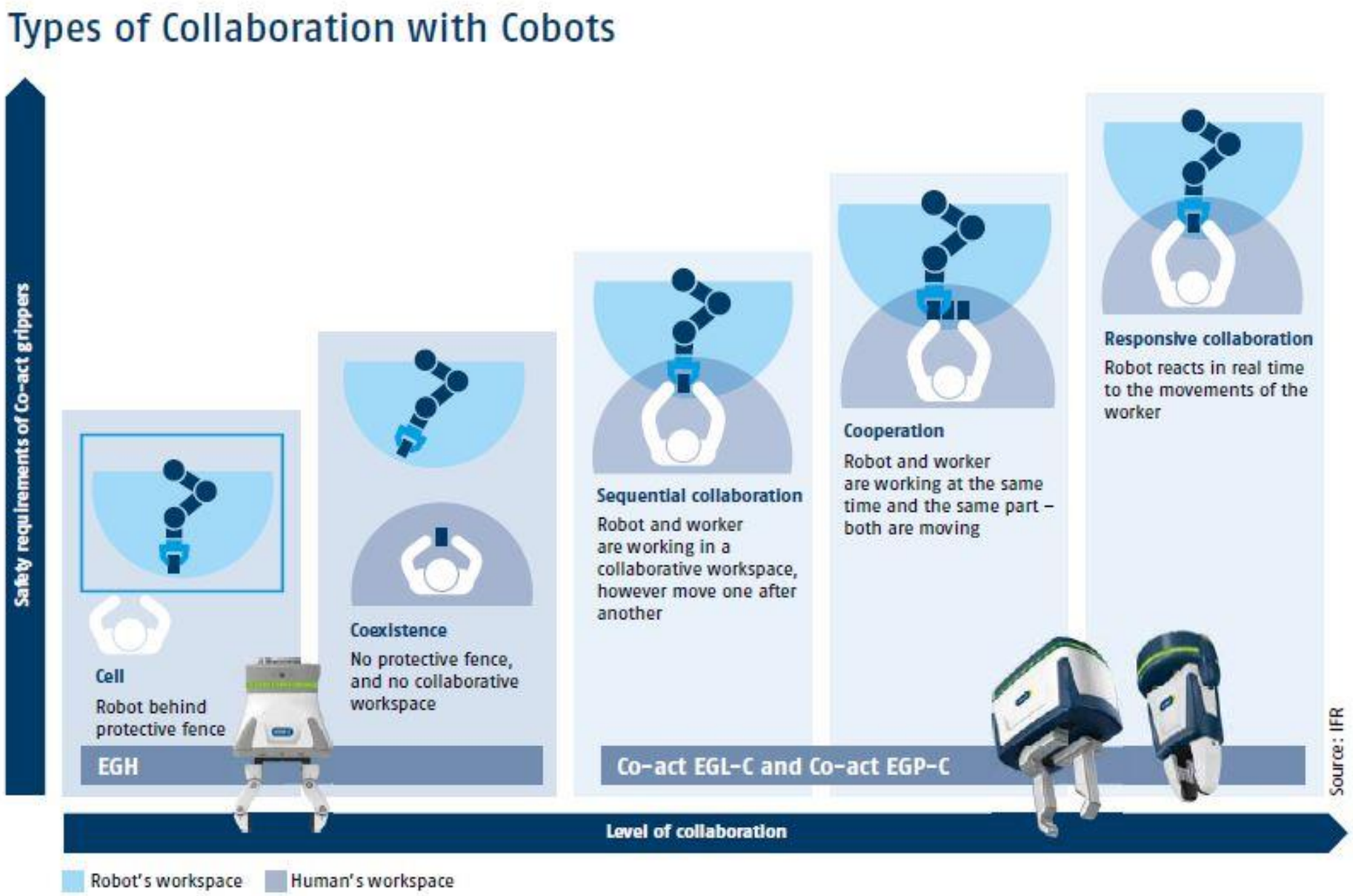
- New to Automation
- No Robot Engineers
- Small and Medium Enterprises, aka SME's.

In 2016, there were 249,962 firms in the manufacturing sector.

Approximately 90% had less than 100 employees.

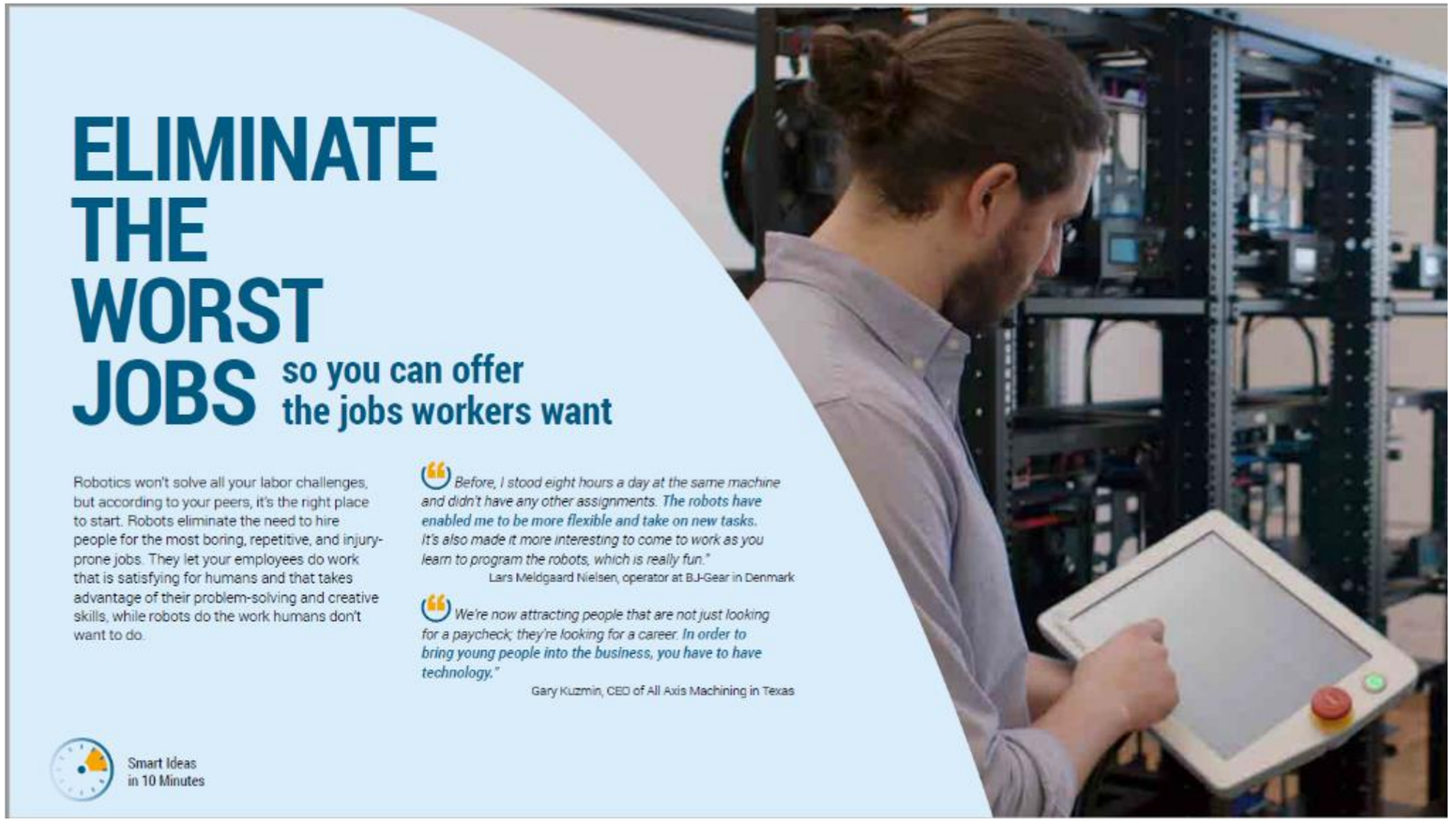
Source: U.S. Census Bureau, Statistics of U.S. Businesses

RANGE OF COLLABORATIVE MODELS



AUTOMATE THE DULL & DIRTY

- Push skilled operators into higher value activities.
- Increase workforce satisfaction.
- Improve the perception of manufacturing.

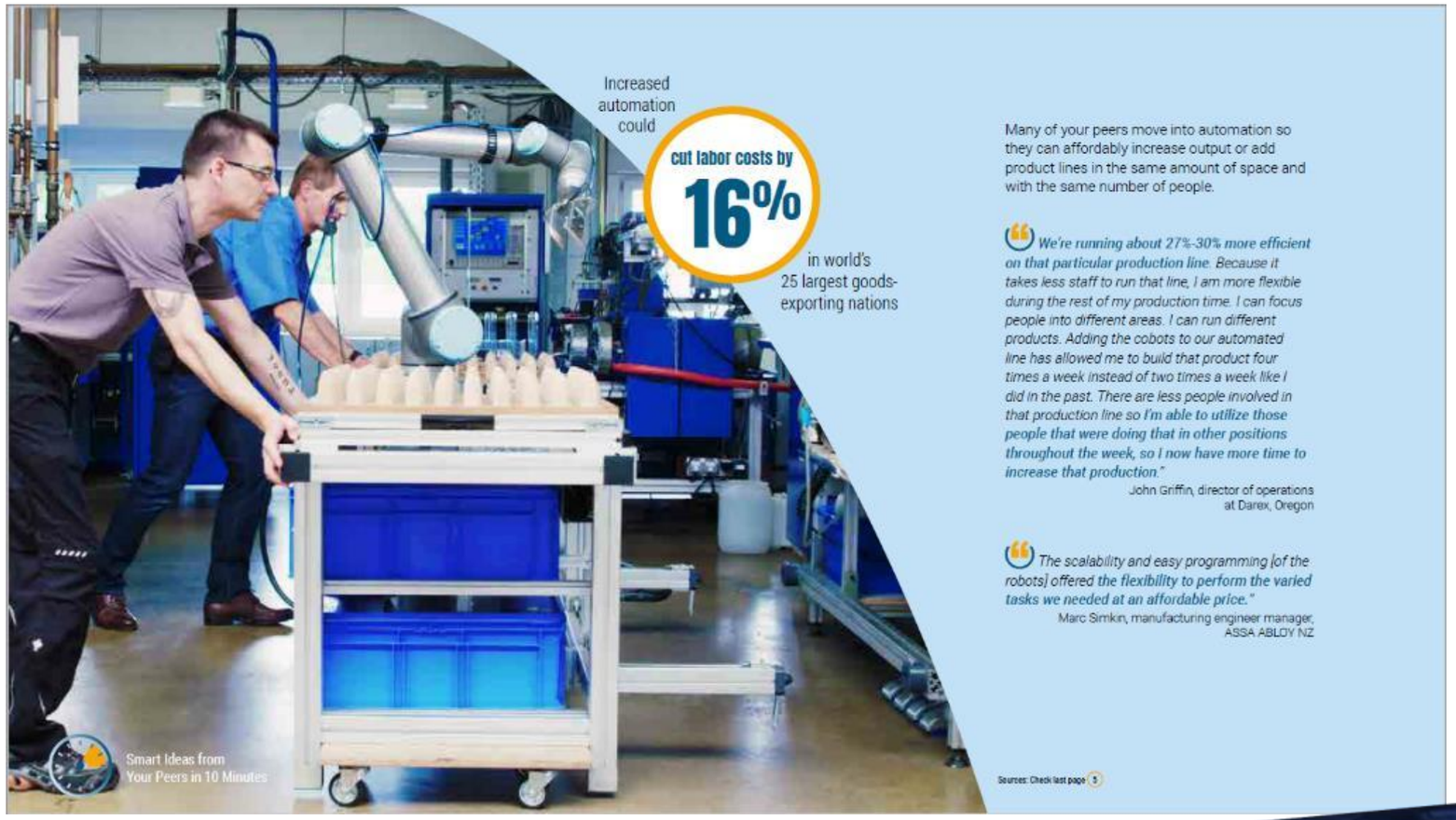


AUTOMATE THE DANGEROUS

- Push skilled operators into higher value activities.
- Reduce workplace injuries, insurance and workers' comp claims.
- Improve the perception of manufacturing.

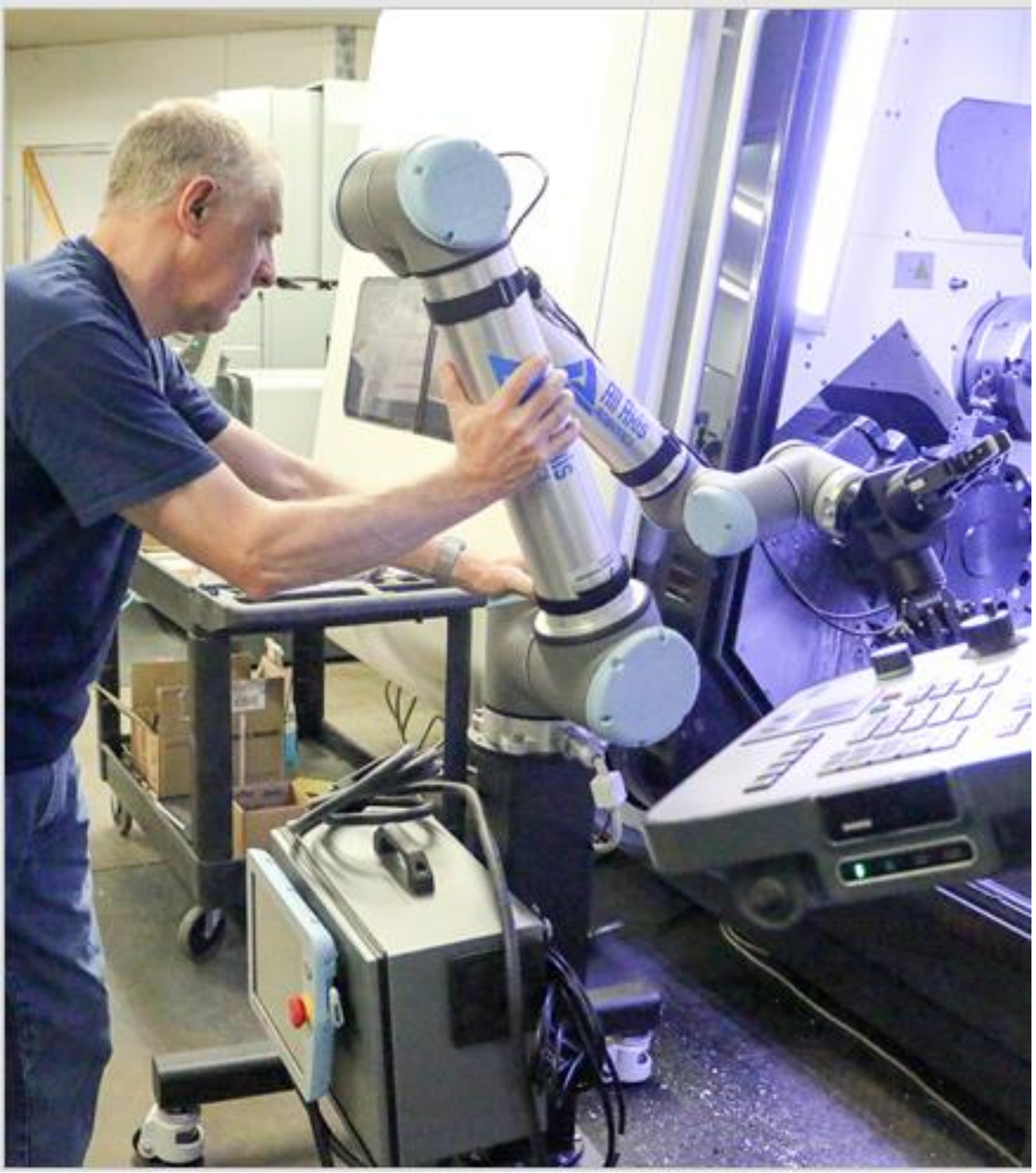
INCREASE MANUFACTURING FLEXIBILITY

- Cobots are flexible, easy to reprogram and redeploy.
- Large (200+) UR+ eco system of plug-n-produce tools, accessories, peripherals.



ROBOT AS A TOOL

- Embraced by job shops & contract manufacturing (assembly, machining, molding, packaging).
- Fleets of robots deployed based on daily production schedules.
- Rapidly emerging rental market – by the month, week, day and hour.



CASE STUDY:

ALL AXIS MACHINERY

Small machine shop in Dallas, TX

- Multi process metal fabricator serving a wide variety of industries
- Lack of Available Manual Labor
- Turning away orders
- Unwanted downtime on machines
- Legacy machines, no robot programming skills in house.

ALL AXIS MACHINING: THE ROI

- Rapid deployment with off the shelf UR+ grippers, stands, bases.
- Automated 6 different applications
- First automated job completed 2 ½ months early with 60% profit increase
- ROI for robot in 4 months
- Spindle on-time increased from 8 to 20 hours per day
- Accuracy and quality improved

CASE STUDY:

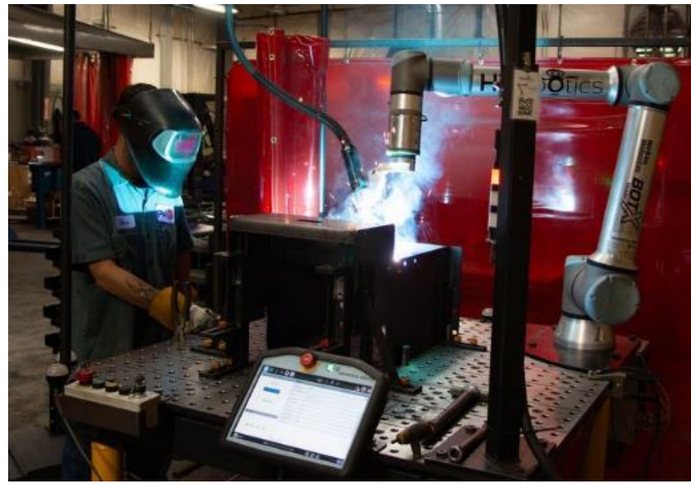
PMI

Metal fabricator in rural Wisconsin running 3 shifts.

- Severe shortage of skilled welders.
- Unable to accept additional orders from current and new customers.
- Traditional automation in house, but not suitable for high mix / small lot runs.
- Growing requests for certified welds for key customers
- UR Robots installed in press loading applications..

PMI: THE ROI

- BotX Cobot Welder implemented by CSI Hirebotics, rented by the hour!
- Quotes and orders increasing.
- Part changeover time reduced to 15 minutes
- Once robot and programmer are validated, welds can be certified.
- Skilled welders re-deployed to higher value, more profitable complex weldments.
- Improved ability to attract younger engineers and operators.
- Bottom line: BotX is operating at 1/2 the cost of a skilled welder.



CASE STUDY:

PARADIGM ELECTRONICS

- Located in Toronto, Canada
- Manufacturer of high performance loud speakers
- Higher than anticipated demand for new labor intensive cabinets
- Struggle to find skilled labor to meet demand
- Process required operator interaction.

PARADIGM ELECTRONICS: THE ROI

- Installed pendulum-type operation where robot and operator safely interact
- Cobot does initial buffing and sanding, then operator takes over final polishing
- Total installation & startup was just over one month
- Solved the back-log on popular new cabinets
- Increased throughput by 50%
- 14 month ROI

CASE STUDY:

EVCO PLASTICS

Contract Injection Molder in rural WI

- 3 Shift operation
- High mix / low volume
- Evco customers pushing for more value add, including complex assembly.
- High staff turnover, difficult to hire, repetitive motion injuries.
- Large base of traditional automation, could not be justified in new applications.

EVCO PLASTICS: THE ROI

- Internal DIY Integration by small automation team.
- Automated multiple applications: Assembly, Packaging, Palletizing, 3D Printer Harvesting.
- Expanded production without additional hiring. Effective doubled operator output in robot cells.
- Reduced workers compensation claims, insurance rates.
- Moving skilled operators into higher value tasks.
- ROI on robot projects in 6-9 months

CASE STUDY:

TASK FORCE TIPS

- Manufacturer of firefighting equipment located in Indiana
- Wanted to transition their operators tending machine cells into more complex & value added tasks
- Have long integrated robots with machine tools - but wanted a flexible solution for multiple applications

TASK FORCE TIPS: THE ROI

- Installed 4 UR cobots: 3 machine mounted and 1 portable cart mounted.
- 34 day ROI
  - 1 hour per operator per shift to set up the robot
  - 21 hours unassisted machine tending
- Reduced staffing requirement from 7 to 3 operators, increased capacity
- Machine downtime eliminated

CASE STUDY:

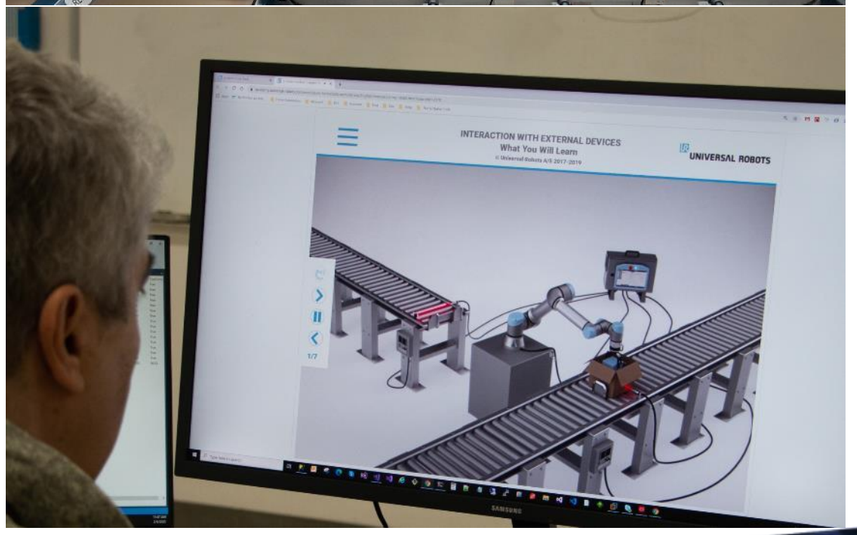
DCL LOGISTICS

Multi-channel logistics company with fullfillment centers in Kentucky, Los Angeles and Silicon Valley

- Faced an explosion in e-commerce orders and rising labor costs
- Wanted to automate, but large, rigid enterprise solutions couldn't adjust to seasonal demand
- Needed a scalable, modular solution they could self-integrate and operate alongside workers without safety guarding

DCL LOGISTICS: THE ROI

- Deployed a UR10 cobot in order fulfillment
- Productivity increased by 500%
- ROI for robot in 3 months. Labor costs reduced by 50%
- Integrated cobot with existing IT-infrastructure
- Leveraged free online UR Simulator and UR Academy modules in developing the system
- Used UR+ certified gripper, I/O extension and cell equipment for fast and risk-free deployment
- Created a fulfillment cell with scanners, sensors, solenoids, conveyors and security lights controlled through UR controller
- Plan to integrate up to 20 additional UR cobots in integrated conveyor system



CASE STUDY:

PALTAC Corporation

- PALTAC is Japan's leading wholesaler of cosmetics, daily necessities, and general pharmaceutical products
- PALTAC sought a robotic piece-picking solution to further automate operations by picking and placing items of varying size, weight and shape
- Challenge was to find a solution able to handle a large number of different and densely packed items

PALTAC: The Solution

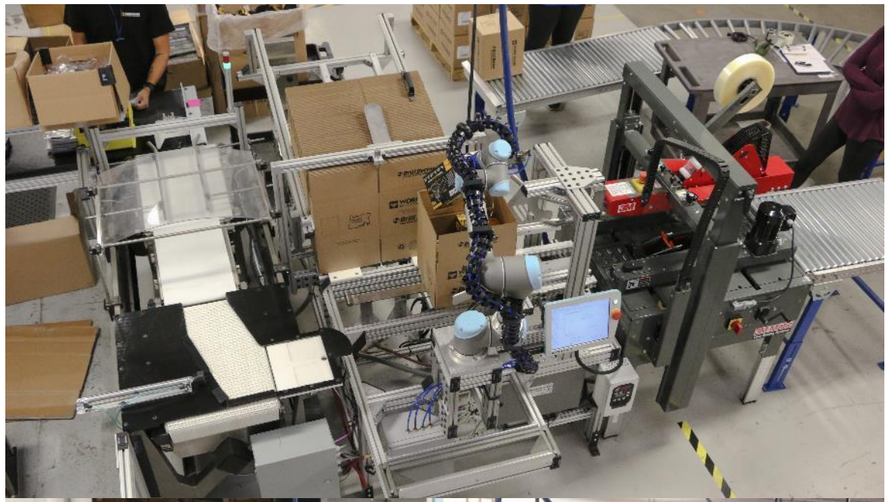
- Installed RightPick piece-picking solution from CSI **RightHand Robotics** into multiple workcells at PALTAC's RDC Saitama facility
- RightPick is an intelligent and integrated solution that can reliably pick and place a wide range of never-before-seen items at a high rate
- PALTAC is using RightPick as part of the overall automation system in their new 488,000 square foot facility that ships 20,000 SKUs each year with an annual shipping capacity of $1B

CASE STUDY: DAREX

- Darex is a 100 employee family owned manufacturer in Ashland, OR that makes drill and knife sharpeners.
- Located in a small, rural community in Southern Oregon where finding labor is extremely difficult.
- Challenge to improve employee satisfaction, retention & recruiting.
- Need to increase production to maintain customer base.

DAREX: THE ROI

- First robot implemented in-house by a small team with no robot experience.
- All training accomplished on-line at UR Academy.
- Line operator promoted to Robot Supervisor and lead programmer.
- Production capacity increased.
- Payback < 1 Year.
- Additional projects in process.
- Management reports improved ability to recruit new employees – robots are cool!



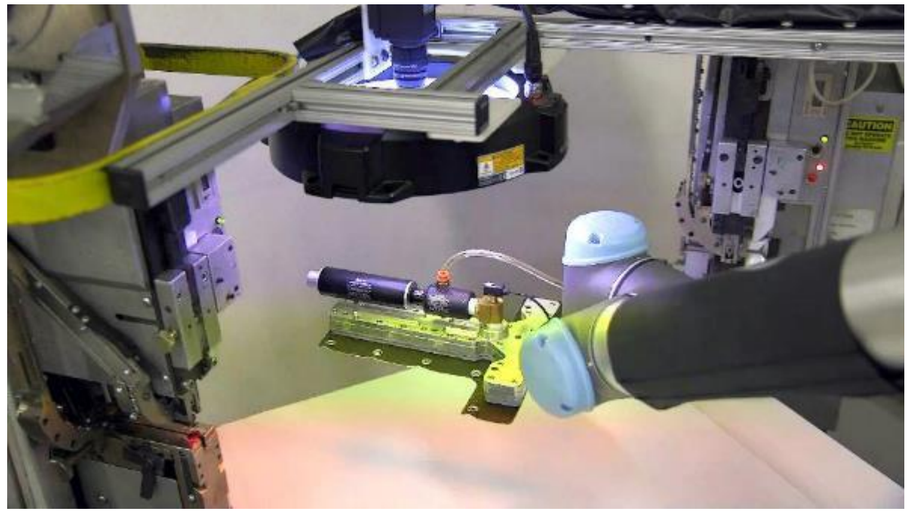
CASE STUDY:

ZIPPERTUBING

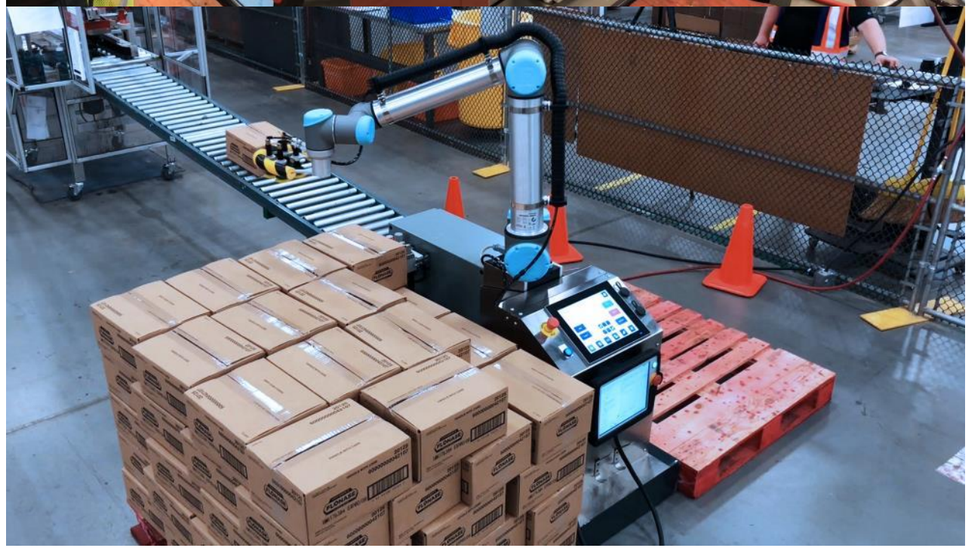
- Small production shop in Arizona
- Industry leader in wrap around cable tubing used by automotive and aerospace industries
- Company faced a very large demand increase
- Workforce struggled to keep up with face-paced, highly precise tasks
- Traditional robots were not in the budgeted price point
- High mix of products

ZIPPERTUBING: THE SOLUTION

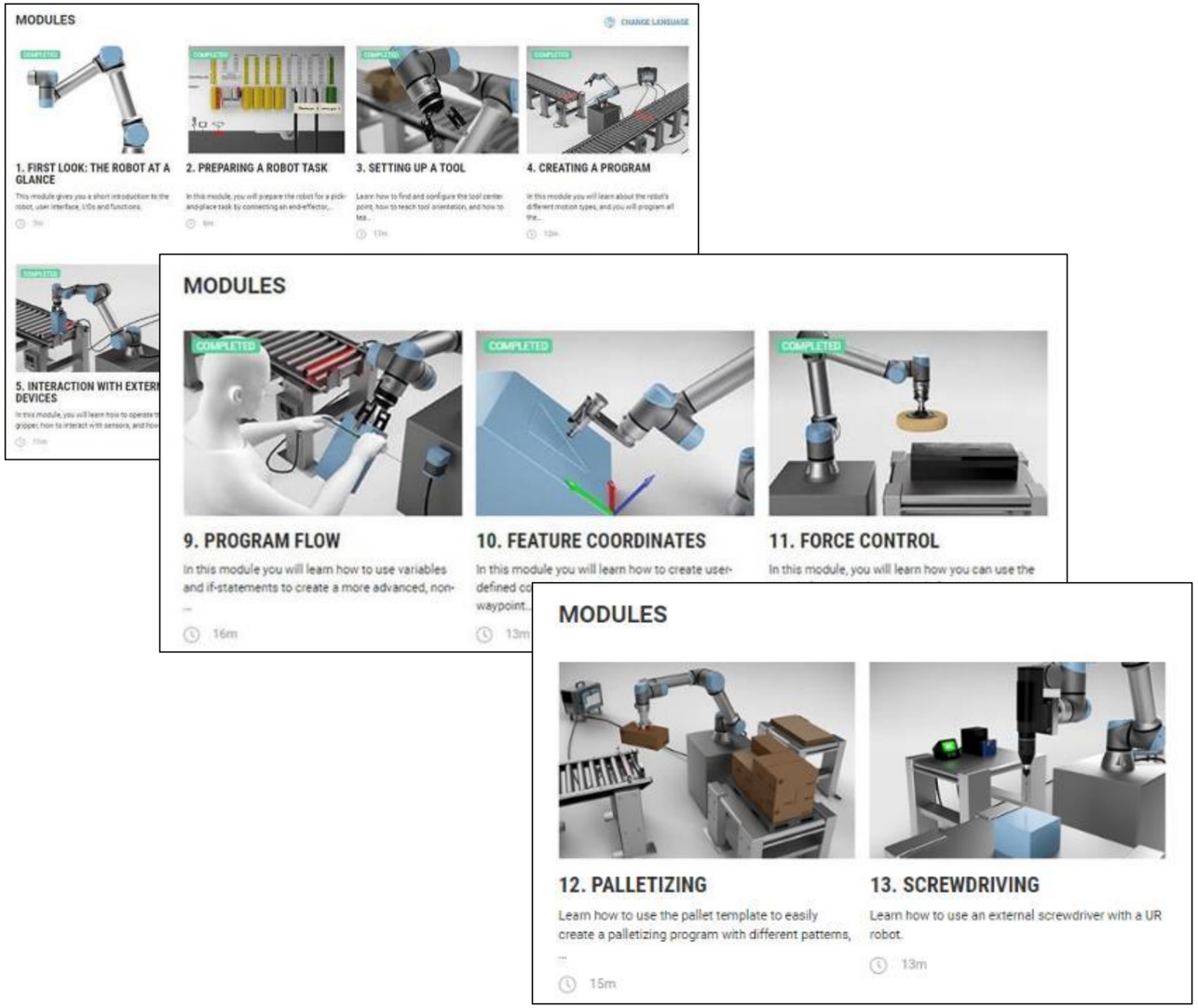
- Self integrated UR cobots
- First install was to pick-and-place pre-cut fabric into snap-set machine
- Leveraging UR+ tool changers for ease of use in change overs
- Achieved zero part defects with the ability to specify 300% more tolerance than with manual operation
- Reduced manual labor force by 32% and re-assigned to more customized, high-skilled tasks
- Enabled lights-out manufacturing to double production. Payback < 1 year.



STANDARD COBOT SOLUTIONS



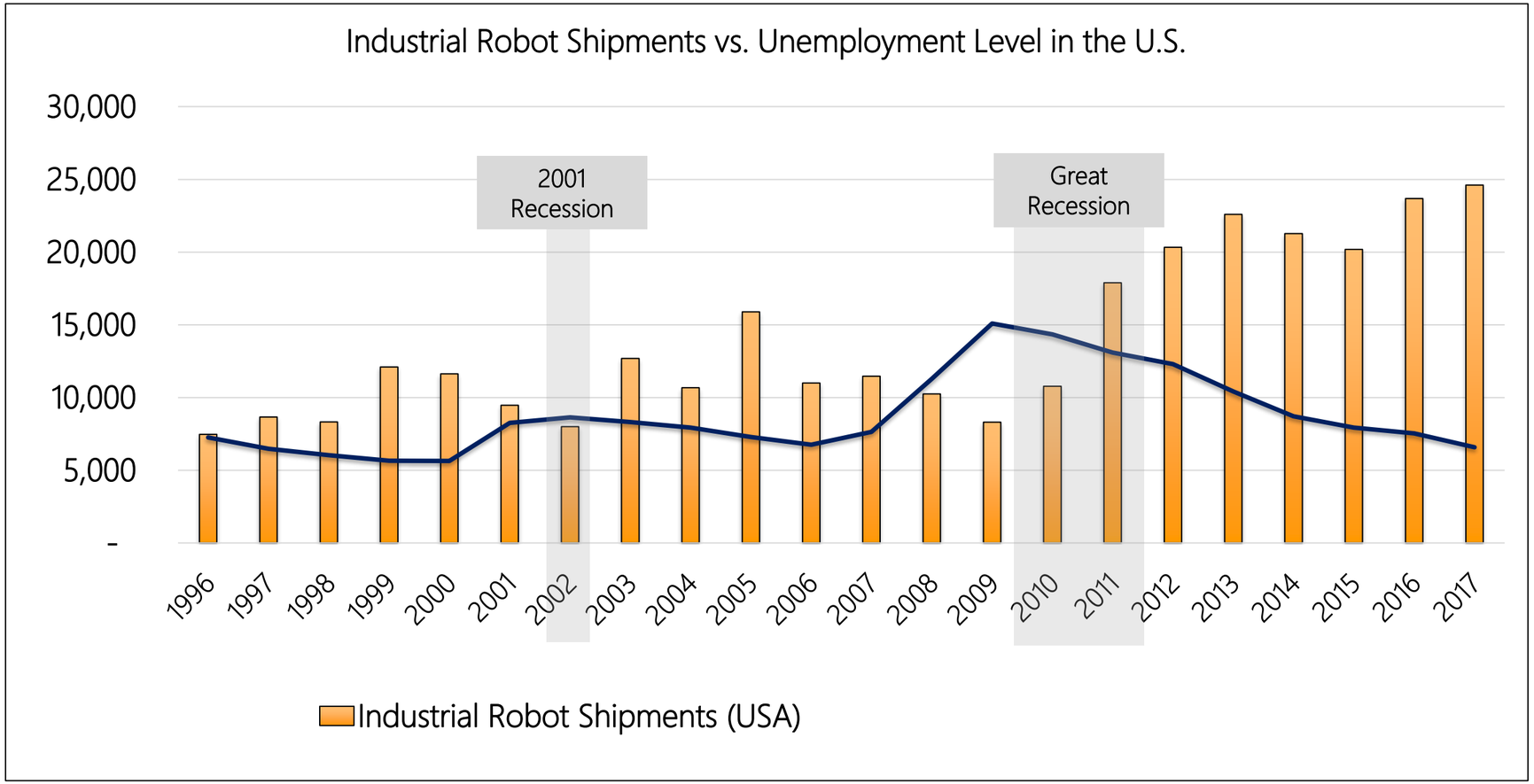
NEW PARADIGMS IN AUTOMATION TRAINING



- Online training available at no charge, at https://www.universal-robots.com/academy/
- 90,000 users
- 130+ countries
- 8 languages

- 56 UR Authorized Training Centers in operation or under agreement.

MORE ROBOTS = MORE JOBS



Source: A3, The Association for Advancing Automation, Bureau of Labor Statistics

Statistically Proven:

Robots, like other advancements such as the cotton gin and computers, do not create unemployment.

For more information (or to schedule a demonstration at your plant):

Joe Campbell

Speaker email: joca@universal-robots.com

Website: www.universal-robots.com

Or visit MODEX Booth 1007