



VAN METER



smart

SOLUTIONS SUMMIT

EXPLORE BENEFITS AND FASTER ROI OF COBOTS

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SOLUTIONS SUMMIT

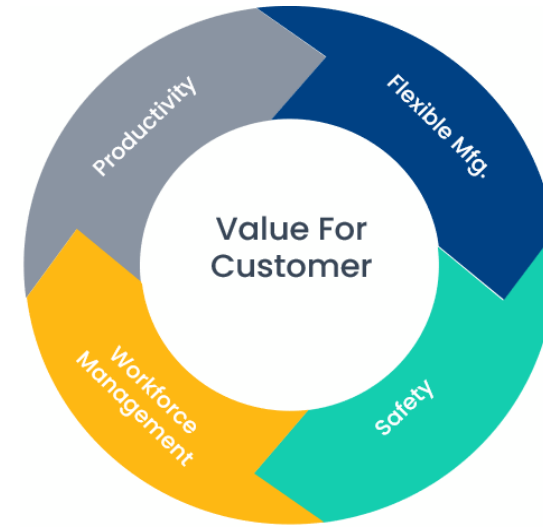
X WHY AUTOMATE?

**X EXPLORE COBOT
SOLUTIONS**

**X REVIEW USE CASES
AND BENEFITS**

X SHOWCASE ROI

CUSTOMER CHALLENGES AND OUTCOMES



150%

INCREASE IN
AUTOMATABLE TASKS IN
10 YEARS

4/5

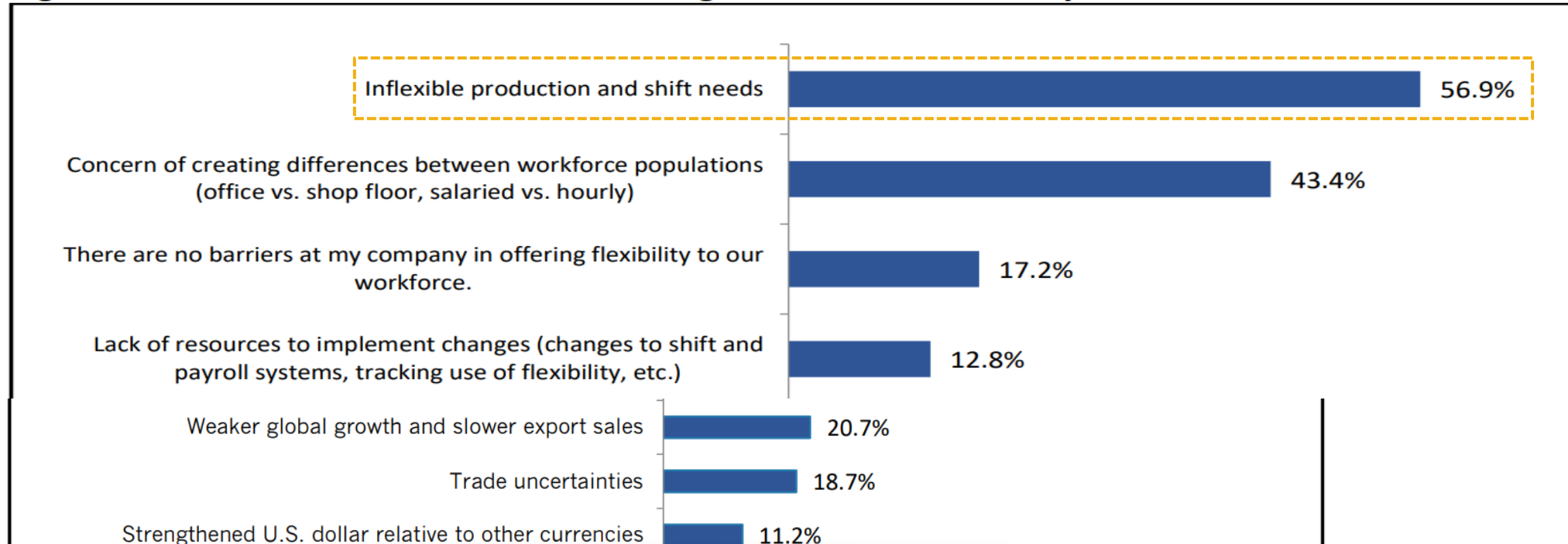
COMPANIES HAVE MORE
THAN 100 PRODUCT
SKUS

2M

SKILLED MANUFACTURING
JOBS WILL GO UNFILLED

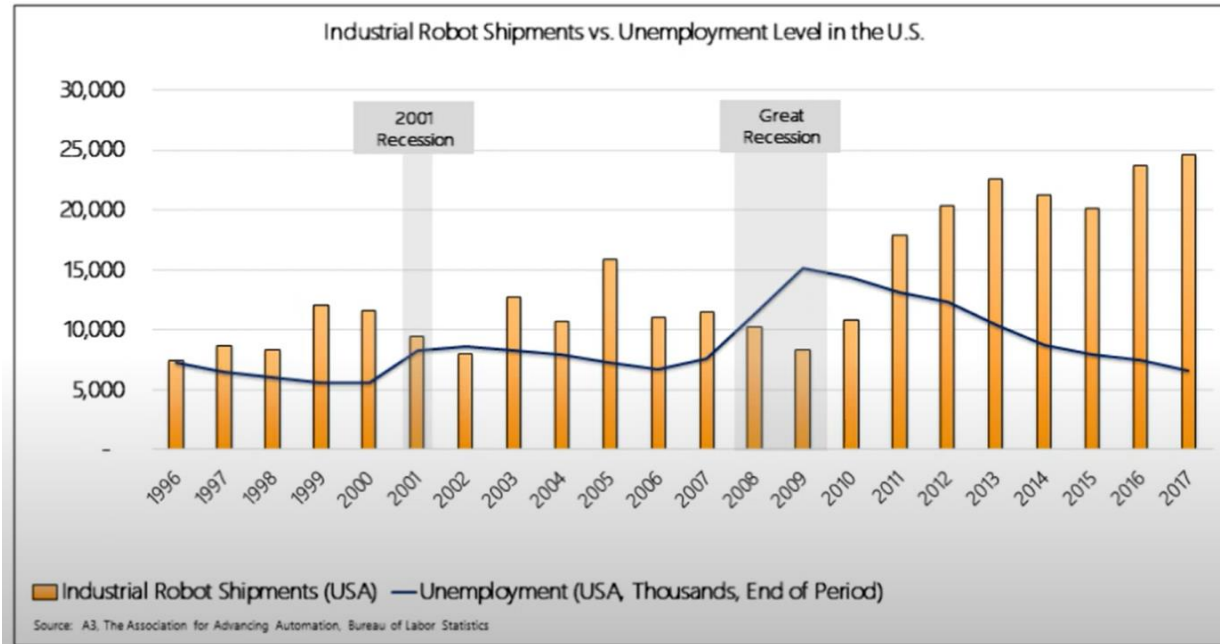
TODAY'S CHALLENGES

Figure 7: Barriers Manufacturers Face in Being Able to Offer Flexibility to Workers



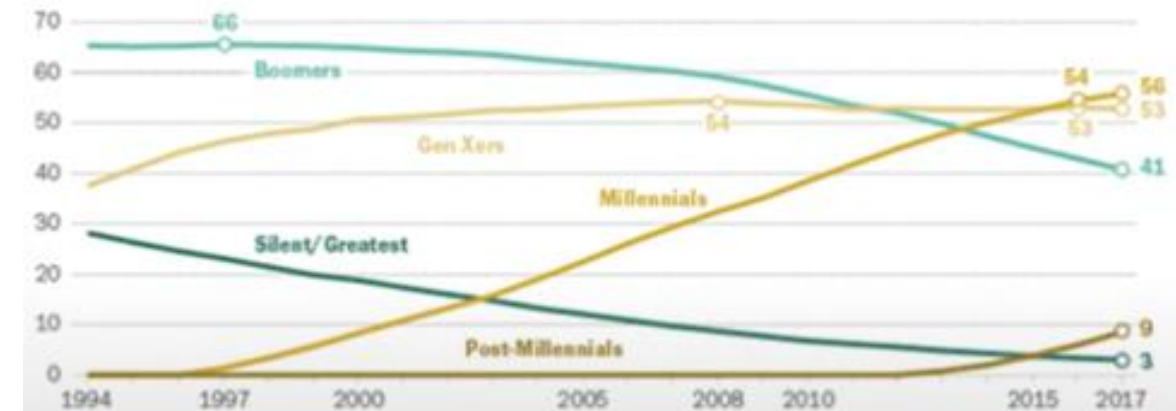
SOURCE: Manufacturers Outlook survey- June 2023

LABOR MARKET AND DEMOGRAPHICS



Millennials became the largest generation in the labor force in 2016

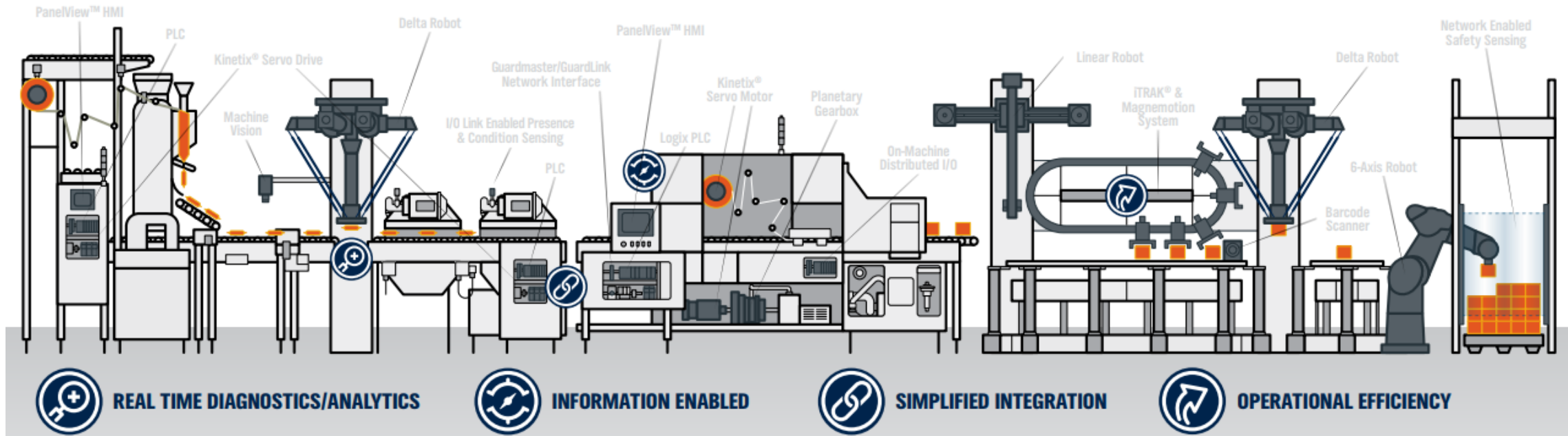
U.S. labor force, in millions



Note: Labor force includes those ages 16 and older who are working or looking for work. Annual averages shown.
Source: Pew Research Center analysis of monthly 1994-2017 Current Population Survey (IPUMS).

PEW RESEARCH CENTER

SMART MACHINE SOLUTIONS



Robotics

Motion Control

Mechatronics

ROBOTICS SOLUTION OFFERINGS

INDUSTRIAL ROBOTS



COLLABORATIVE ROBOTS



INDUSTRIAL VS. COLLABORATIVE



INDUSTRIAL ROBOTS

- Suitable for repeatable tasks in a fixed spot
- Applied in a mass production manufacturing setting
- Longer deployment time
- Safety fence is necessary with difficulty of line change
- Typically, part of a fully automated cell

COLLABORATIVE ROBOTS

- Possible to work in various applications alongside humans
- Applied in various industries with different tasks
- Faster ROI due to lower hardware and integration costs
- Safety fence is not necessary with flexibility of line change
- Can be used in semi-automated cell (80/20 rule)

TYPES OF INDUSTRIAL ROBOTS

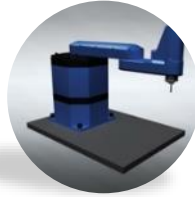
Cartesian



Parallel (Delta)



SCARA



Articulated



Collaborative



AGV



AMR



COLLABORATIVE ROBOTS

- Also known as “Cobots”
- Designed to work with humans
- Ideal for repetitive applications or health hazard for humans AND require human interaction

BENEFITS OF COLLABORATIVE ROBOTS



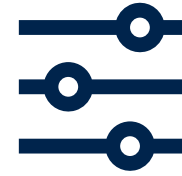
SAFE & FENCELESS

- Protect workers through collision detection.
- Work alongside workers without safety fences.



EASY

- Simple to program.
- Lightweight and convenient to deploy.



FLEXIBILITY

- Requires less space.
- Minimizes changes in production layout.
- Flexible to change operation setting.

WHAT CAN YOU AUTOMATE WITH COBOTS?



CNC Machine Tending

Placing material on pallet after injection into/removal from CNC machine



Pick & Place

Simple loading/unloading work such as moving objects between tasks



Air Blowing

Exterior cleaning of finished products or workpieces with spiral spray motion and multi-angle composite spray motion



Assembly (Screw, Gear)

Traditionally manual assembly tasks such as screw locking and gear assembly



Polishing & Deburring

Burr removal and surface polishing after processing



Gluing/Bonding

Spraying of consistent amount of adhesive for gluing and bonding



Plastic Injection Assistance

Detaching item from mold of injection molding machine and loading onto/unloading from pallet



Packaging & Palletizing

Product packaging and palletizing, including transportation and loading of packaged products (e.g. electronics/F&B industries)



Press Forming Assistance

Picking up panel for loading onto/unloading from press machine



Welding

Welding parts like skilled welder by various paths with certain quality



Service

Safely and repeatedly performs pre-defined tasks in accordance with user needs in service industries like medical and F&B



Inspection

Inspection of parts for internal defects and confirmation of parts assembly

USE CASE

PALLETIZING SOLUTION

CHALLENGE

Streamline operational processes - available space was constrained, and the workers were burdened with a substantial workload.

SOLUTION

Massman deployed a Doosan cobot to handle palletization of boxes arriving along the rails. **Requirements:** must operate in same space as works and take up minimal footprint of floor space.

RESULT

- Achieved continuous full-time operation
- Anticipated ROI within six months
- Enhanced productivity due to uninterrupted operation



USE CASE

PALLETIZING SOLUTION

CHALLENGE

Attracting extra workforce within the present market conditions to enhance productivity. Sought to relieve their existing workers from manual and repetitive tasks.

SOLUTION

Utilize two Doosan cobot palletizers, in collaboration with Vention, to support three production lines. **Requirements:** must be managed entirely in-house

RESULTS

- Three full-time operators reassigned, tripling productivity
- On-site equipment deployment and staff training completed in two days Projected payment period is slightly over 1 year



USE CASE

PALLETIZING SOLUTION

CHALLENGE

Workforce Productivity, Safety

SOLUTION

Doosan Cobot with Turnkey Palletizing Solution

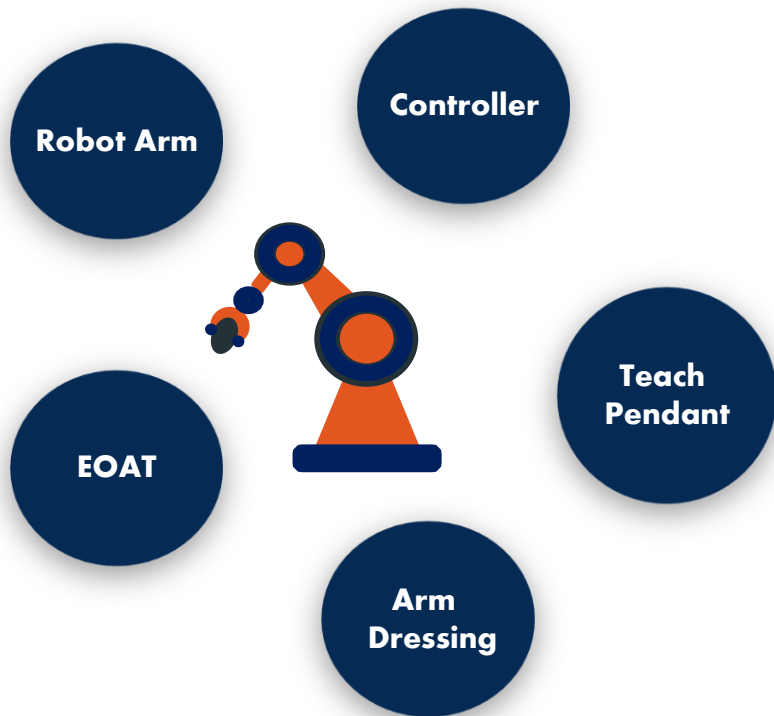
RESULT

- System deployed in 4 weeks, started up in a few hours (not days)



TYPICAL INDUSTRIAL ROBOT SOLUTION

Core Robot Architecture



Complete the Solution



Integration & Services



ELEMENTS OF A COBOT SOLUTION



Robot Arm

- Reach : 1.5m ~ 1.7 m
- Payload : 20kg ~ 25 kg
- Model : H2017, H2515
- Sensor: 6 joint torque sensors
- Repeatability : ± 0.1 mm
- TCP Speed : 1 m/s



Teach Pendant

- Screen : full-glass type 10.1 inch capacitive touch screen
- Cable : 8mm slim cable
- Size : 264 x 218 x 42 mm
- Weight : 0.8 kg



Control Box

- Size : 490 x 390 X 287 mm
- Weight : 9 kg
- Interface: Ethernet, RS232, Modbus-TCP, PROFINET, Ethernet TCP/IP, EtherNet/IP, USB 3.0
- I/O: 32 Digital, 4 Analog I/O (controller), 12 Digital I/O (Flange)

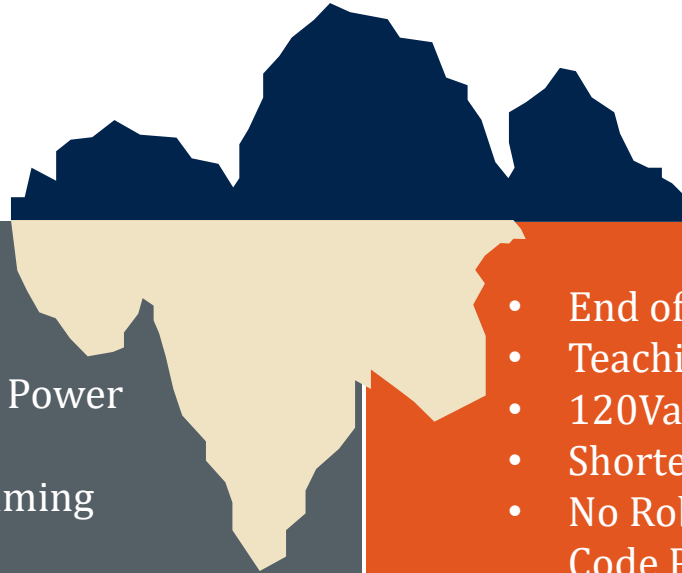
ROI OF INDUSTRIAL VS. COLLABORATIVE



Industrial Robots

✓ Hardware Cost

- End of Arm Tooling
- Fencing & Guarding
- 3-phase 230V/460Vac Power
- Safety Sensors
- Integration & Programming
- Software Licenses
- Maintenance & Repairs
- Longer Deployment Time
- Robotics Skill Set Required
- Dedicated to one task/process
- More Floor Space Needed



Collaborative Robots

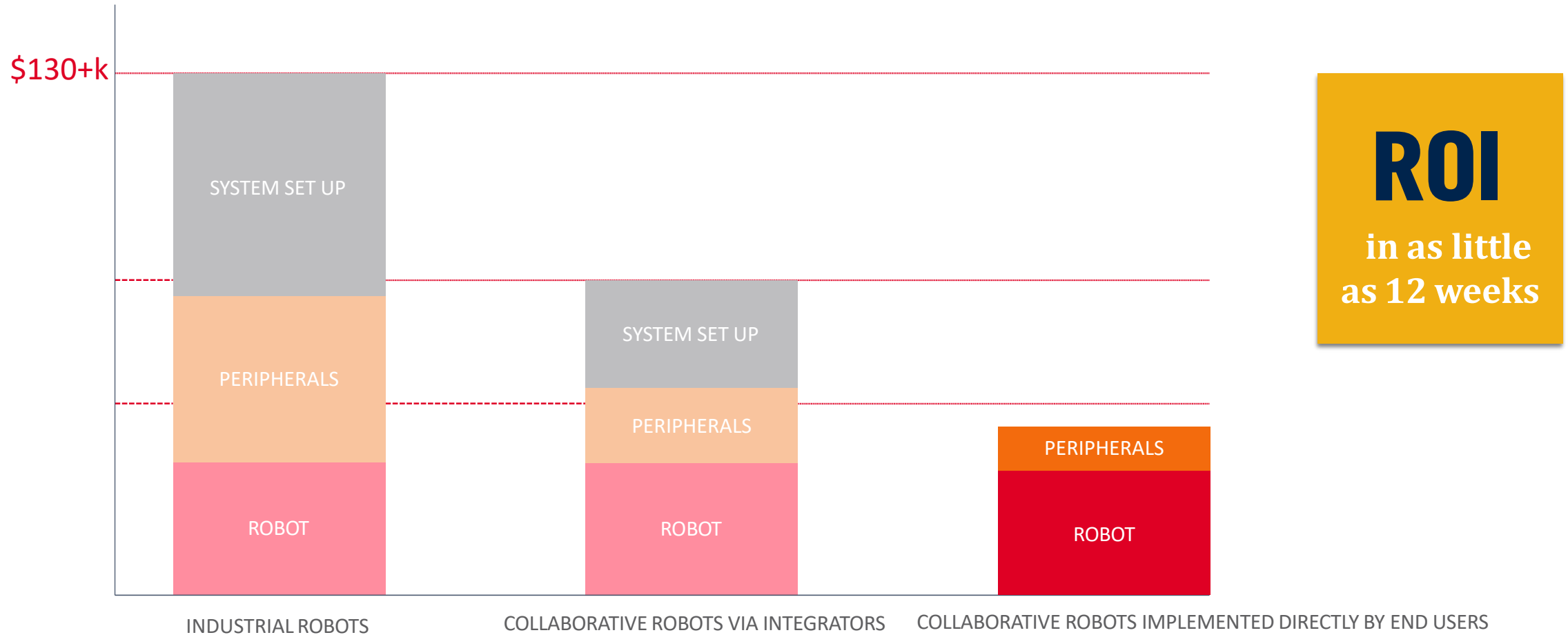
✓ Hardware Cost



- End of Arm Tooling
- Teaching
- 120Vac Power
- Shorter Deployment Time
- No Robotics Skill Set Required/ (No Code Programming)
- Flexible Line Change
- Fits in Existing Factory Floor Space

CUSTOMER VALUE

QUICKER ROI WITH COLLABORATIVE ROBOTS



RETURN ON INVESTMENT

6 MONTHS
AVERAGE COBOT PAYBACK

Leverage Van Meter’s ROI Calculators to identify ROI

Cost of Operator	\$ 55,000
Cost per hour =	\$ 26
Doosan Robotics	
Lifetime hours rating =	35,000
Robot, Pedestal, EOAT, 3yrs	\$ 48,900
Cost per hour =	\$ 1.40
Hourly Wage Differential =	\$ 25.05
Robot Total lifetime savings =	\$ 876,581
Hours/Day =	18
Days/Week =	5
Savings/Week =	\$2,254
Payback (weeks) =	21.7
Payback (months) =	5.4
Payback (years) =	0.5
Number of Units =	1



VAN METER

**Pick & Place**
Simple loading/unloading work such as moving objects between tasks

**Press Forming**
Picking up panel for loading onto/unloading from press machine

**Polishing & Deburring**
Burr removal and surface polishing after processing

**Assembly**
Traditional assembly tasks like screw driving and gear assembling

**Gluing & Bonding**
Spraying of consistent amount of adhesive for gluing and bonding

**Air Blowing**
Exterior cleaning of finished products or workpieces with spiral spray motion and multi-angle composite spray motion

**Packaging & Palletizing**
Heavy objects stacking and palletizing on logistics and automated procedures

**Inspection**
Inspecting internal/external defects and assembly quality

**Machine Tending**
Feed the CNC machine and load/unload the subject into the pallet

**Welding**
Welding parts like skilled welder by various paths with certain quality

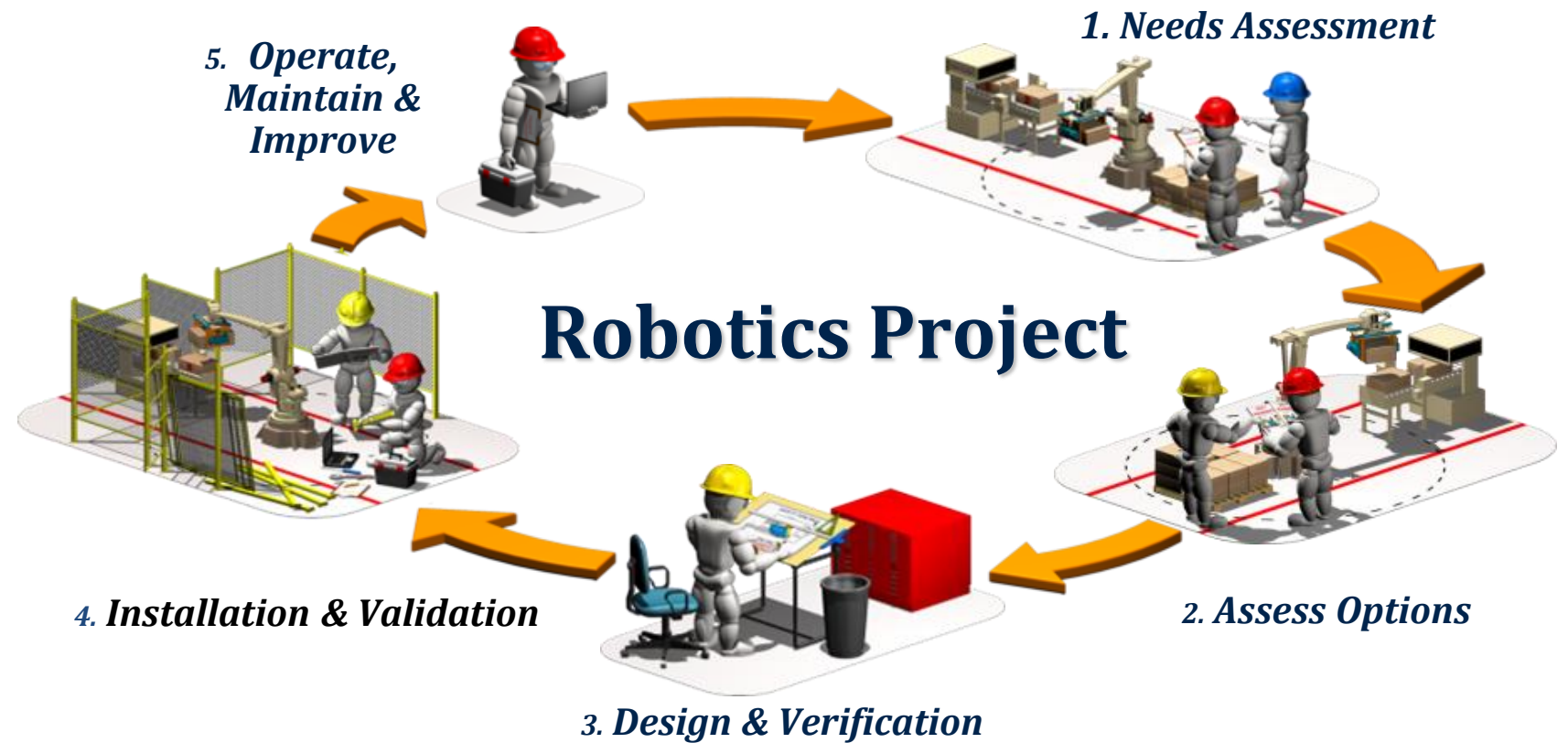
**Plastic Injection Support**
Detaching item from mold of injection molding machine and loading onto/unloading from pallet

**Heavy Object Handling**
Stacking, transport and handling of multiple objects simultaneously in fast-paced production procedures, such as those found in the logistics and fabric industries





**QUICK
DEPLOYMENT
AND FAST ROI**



**The faster you can get the robot cell in production
the sooner the payback!**

HOW CAN YOU BENEFIT?

Let collaborative
robots help you and
your business.



**INCREASE PLANT
FLOOR AND
PERSONAL SAFETY**



**IMPROVE
PRODUCTIVITY AND
RELIABILITY**



**COMBAT
WORKFORCE
CHALLENGES**

SMART MACHINE AND ROBOTICS TEAM

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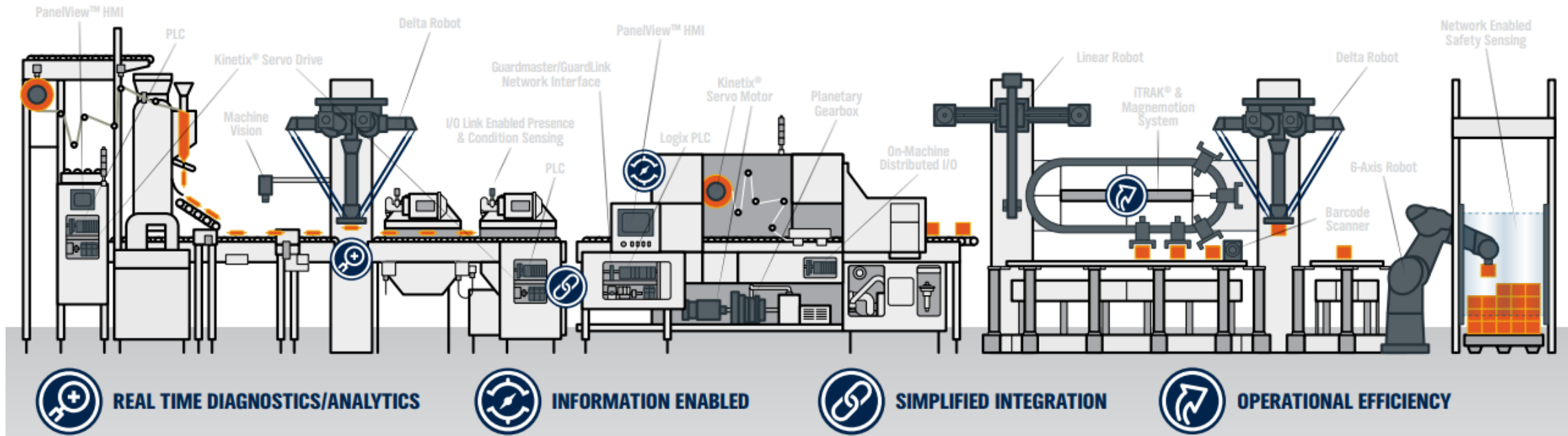
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SOLUTION CONSULTANT

SMART MACHINE SOLUTIONS



Robotics

Motion Control

Mechatronics

QUESTIONS?

THANK YOU!



GEORGE ROVOLIS

Smart Machines & Robotics Manager, Van Meter



WE WANT TO HEAR FROM YOU!

BREAKOUT SESSION FEEDBACK

