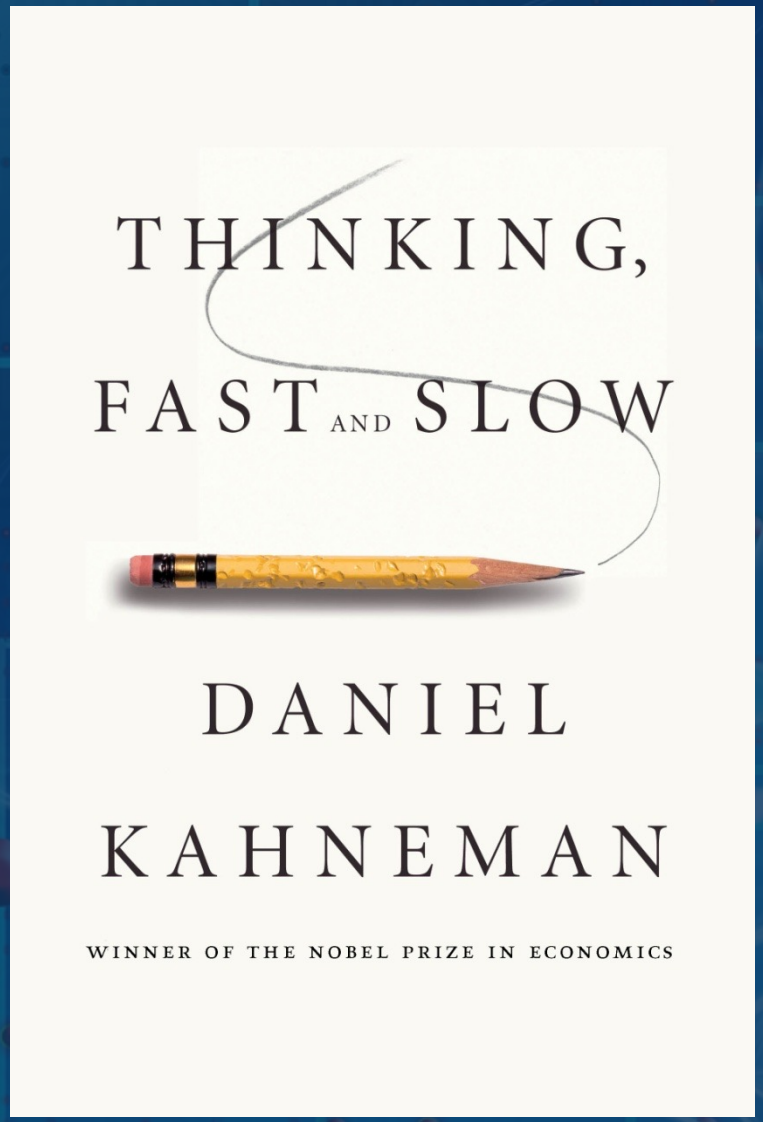
Leveraging Shop Floor Data for Continuous Improvement

A bat and a ball together cost $1.10. The bat costs $1.00 more than the ball. How much does the ball cost?

Ball	$0.10
Bat	$1.10
Total	$1.20

Ball	$0.05
Bat	$1.05
Total	$1.10



Two Modes of Thinking

System 1

- Detect Object More Distant than Another
- Orient the Source of a Sudden Sound
- Complete the phrase “Bread and…”
- Detect Hostility in a Voice
- Answer 2 + 2

System 2

- Focus on the Clowns
- Look for Woman with White Hair
- Count number of letter “a” in a Page
- Fill out a Tax Form
- Compare two Washing Machines

Leveraging Shop Floor Data for Continuous Improvement

Leveraging Shop Floor Data for Continuous Improvement

Leveraging Shop Floor Data for Continuous Improvement

It's Just a Lean Tool

Skilled Career Opportunities for Veterans

with guest speaker

John Lowry

Assistant Secretary,
Veterans Training and
Employment

US Department of Labor

The Tech Ed
Podcast

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The Kaizen Event

HOW FIVE WEEKS OF FOCUSED PLANNING CAN LEAD TO A 40% INCREASE IN THROUGHPUT AND PRODUCTIVITY

By Matt Kirchner, CEO American Finishing Resources

QUESTION: What do you get when you combine the Japanese words for 'change' and 'good'? The textbook answer is the word 'Kaizen,' an approach to lean production that many finishers have likely heard of, but many have yet to become intimately familiar.

If this definition seems less than riveting, consider another. "Kaizen" is five weeks of focused and intense planning, work and follow through that can lead to a 40% increase in coating line throughput and productivity.

Created in Japan following World War II, like other lean approaches, Kaizen focuses on the elimination of waste such as motion, waiting, inventory, transportation, overproduction and rejects.

In a manufacturing or other setting, Kaizen involves what is known as a Kaizen event, basically an activity that concentrates multiple resources from across the organization on the improvement of a specific area of the manufacturing process, for example, a paint or powder coat line.

DOUGLAS DYNAMICS

With manufacturing facilities in Milwaukee, WI, and Rockland, ME, Douglas Dynamics Inc. is the manufacturer of the Western, Fisher and Blizzard brands of snowplows. And its continuous improvement philosophy provides an impressive example of how a finishing operation can benefit from Kaizen.

The company recently faced the need to transfer three entire product lines from a plant in Johnson City, TN, to its facility in Milwaukee, driving the need for efficiency improvements on its coatings line.

The company's operations team rose to this challenge by first determining the anticipated production requirements of an "average year's volume" and then committed itself to the design of a manufacturing process that could accommodate these requirements by operating the plant on one shift per day, four days per week, with the fifth day of each week available to accommodate spikes in market demand or planned equipment downtime. The team further set out to produce a level-loaded production plan; in essence, seeking to create exactly the same production day in terms of scheduling and throughput—each and every day.

With these goals in place, the company turned to its Kaizen approach to attain them.

40% Improvement in Throughput

11 People on 3 Shifts

5 People on 1 Shift

FINISHING UP Fabricators look to add paint, powder coating

Taking It to the Max

MANUFACTURER MAKES THROUGHPUT CHANGES THAT AMOUNT TO 300 PERCENT IMPROVEMENT.

By Matt Kirchner
American Finishing Resources

When it comes to finishers getting maximum throughput and optimal first pass yield from their finishing departments, Metalcraft of Mayville, in Wisc. has quite a story to tell.

It's a story of 300 percent throughput improvements, quadrupling labor productivity and 180 percent performance-to-manufacturing standards. A story of kitting product on the paint line so it can be delivered to the assembly line with maximum efficiency. A story of custom paint racks and jam-packed line density.

Tucked away on the north end of Mayville, a small Wisconsin city of 4,000 people, this contract fabricator, manufacturer and producer of Scagbrand commercial lawn mowers and lawn maintenance equipment has quietly—though aggressively—embarked on a lean journey that would grab the attention of any finisher seeking to improve quality and reduce cost.

Walking the manufacturing floor and making it a point to greet each and every employee by name, Vice President of Operations Randy Gloede reflects on the journey, noting that at the outset the Metalcraft team recognized that the capacity constraint that was the paint coating department would be a key area of focus.

"We looked at how we could do a

Metalcraft focused on reducing waste in the paint department by presenting product to the paint line in a manner that optimizes yield.

It's Just a Lean Tool

Skilled Career Opportunities for Veterans

with guest speaker

John Lowry

Assistant Secretary,
Veterans Training and
Employment

US Department of Labor

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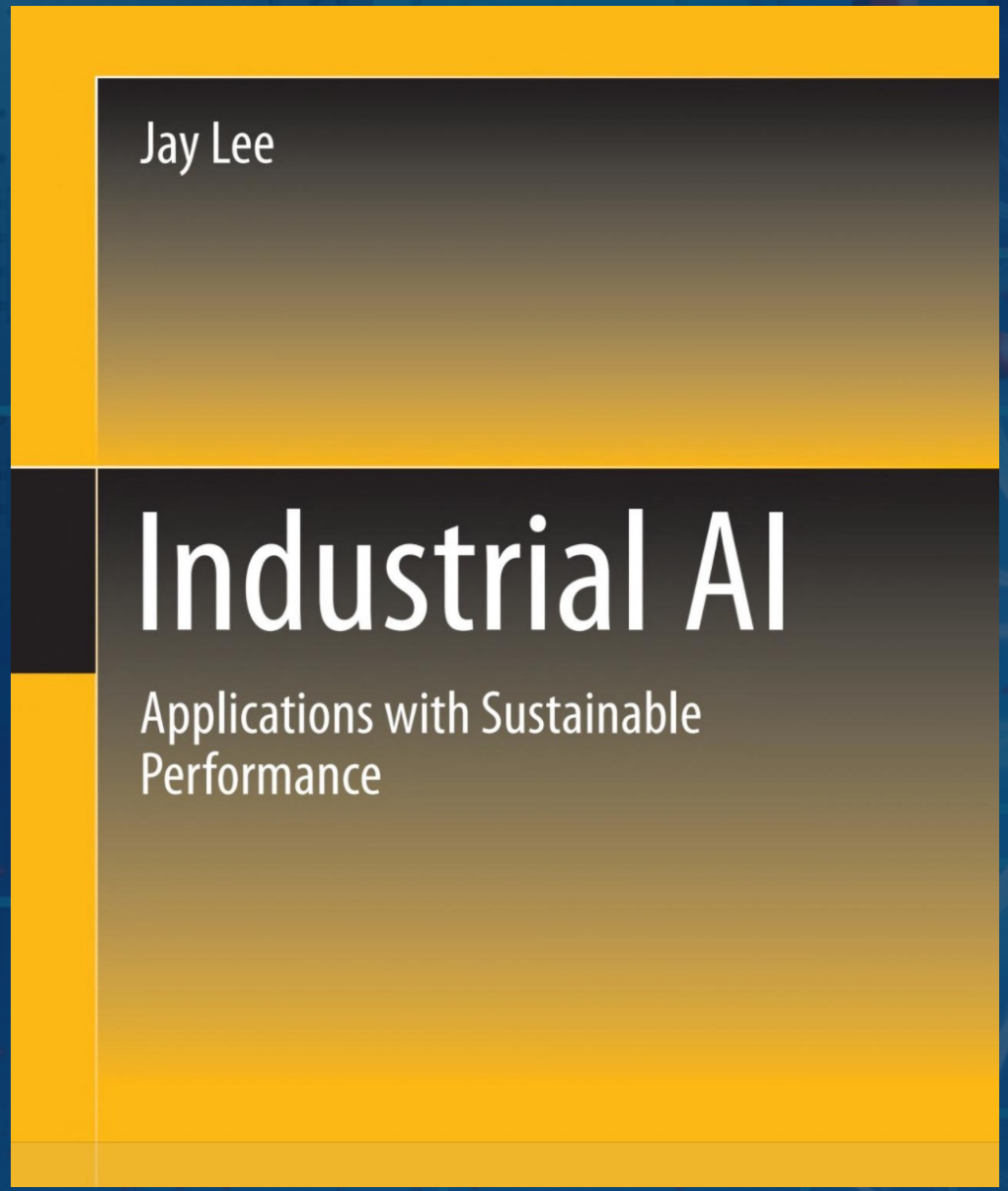
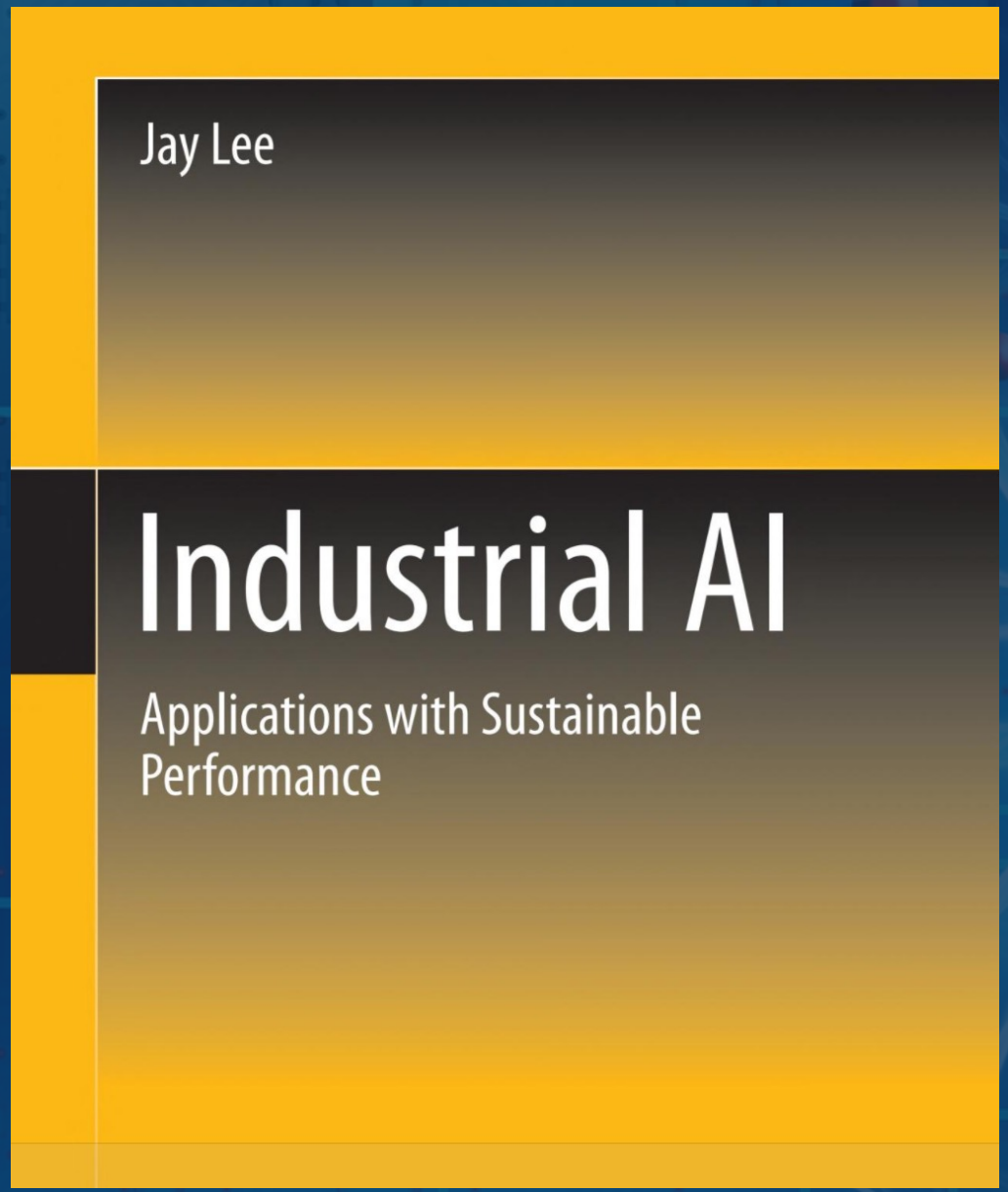


"I've noticed that [AI Scientists] first ask us what data we have before asking what problems we want to solve."



The Integration of People, Things and Systems Together. It's ABCDEF

Analytics

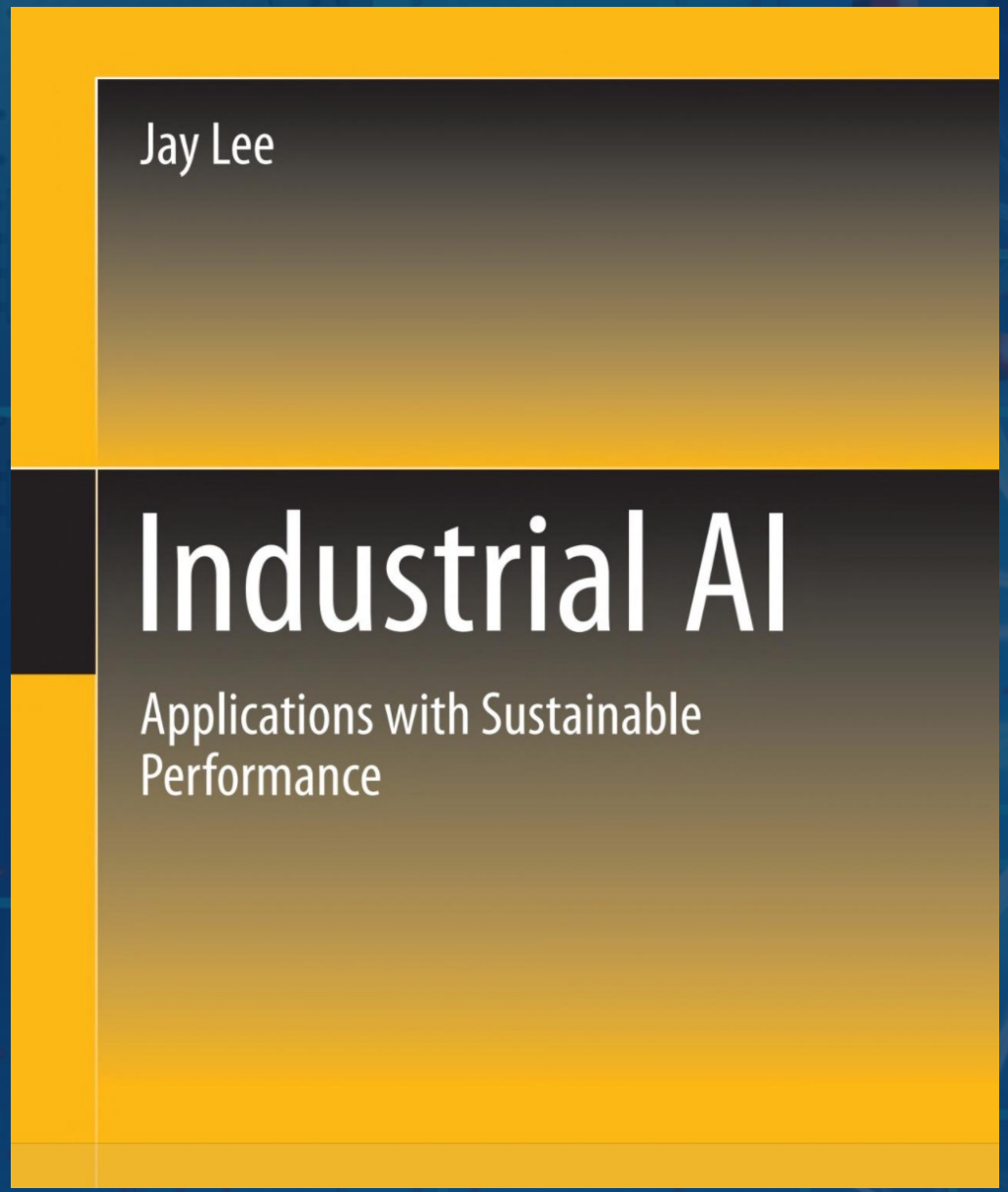
Big Data

Computational Platform (Cloud, Edge, Fog based on embedded Intelligence)

Domain Knowledge (Manufacturing Tech)

Evidence

Feedback (SOPs to achieve closed-loop)



The Integration of People, Things and Systems Together. It's ABCDEF

Analytics

Big Data

Computational Platform (Cloud, Edge, Fog based on embedded Intelligence)

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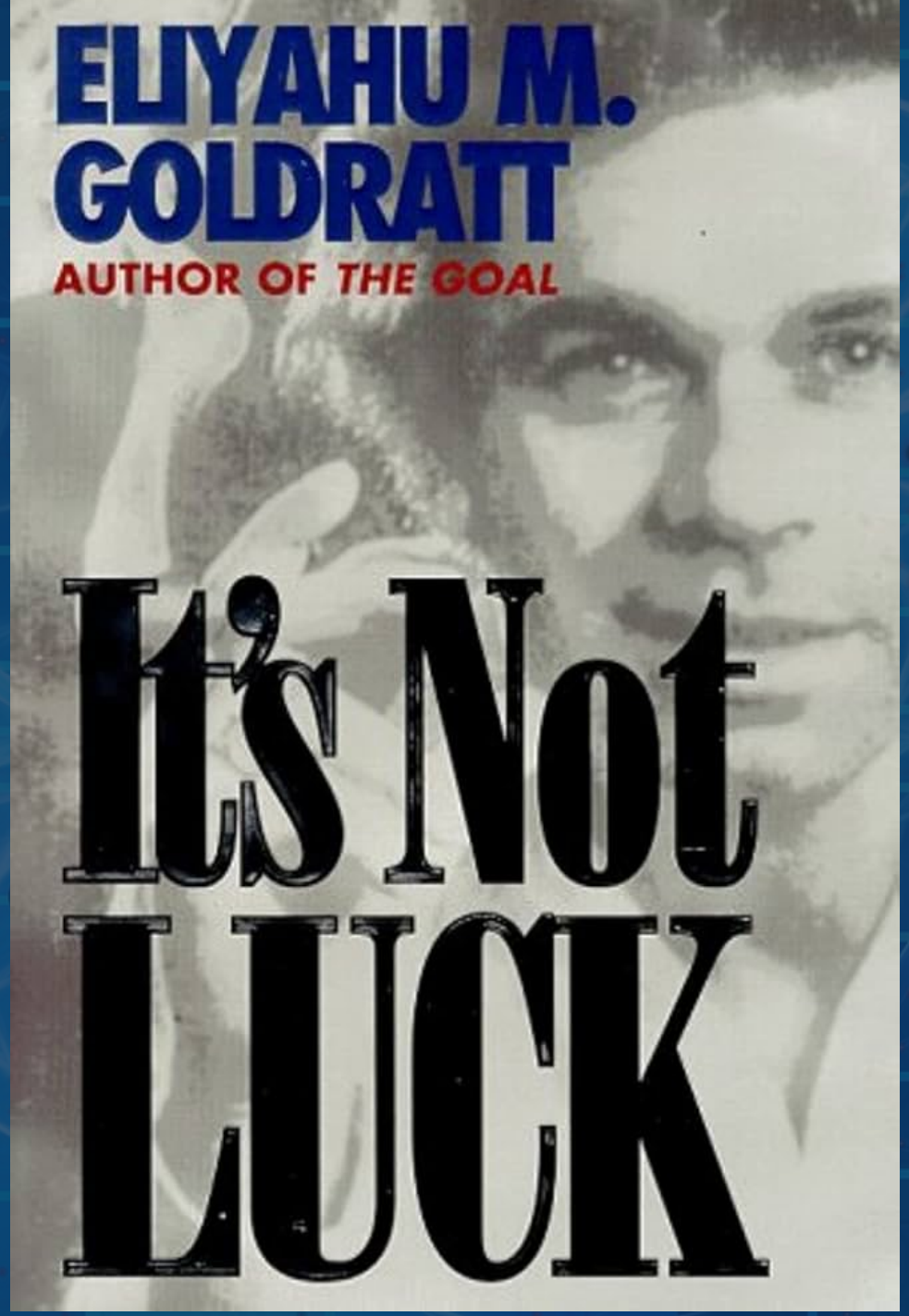
Evidence

Feedback (SOPs to achieve closed-loop)

Eliyahu M. Goldratt and Jeff Cox

THE GOAL


ELIYAHU M.
GOLDRATT
AUTHOR OF THE GOAL
It's Not
LUCK

Late Orders

Poor Training

Unskilled Maintenance

Late Orders

Poor Training

Expedites

Late Orders

Lost Customer

Spoilage

Unskilled Maintenance

Poor Training

Waiting for Parts

Customer Rejects

Work Order Compliance

Employee Attendance

Expedites

Unskilled Maintenance

Late Orders

Lost Customer

Spoilage


Poor Training
Waiting for Parts
Customer Rejects
Work Order Compliance
Safety
Employee Attendance
Expedites
Energy Cost
Chemical Maintenance
Unskilled Maintenance
Late Orders
Lost Customer
Spoilage

Preventive Maintenance

Poor Training

Waiting for Parts

Long Breaks

Customer Rejects

Work Order Compliance

Safety

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Expedites

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Chemical Maintenance

Unskilled Maintenance

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Machine Downtime
Unskilled Maintenance
Expedites
Safety
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Energy Cost
Late Orders

Continuous Improvement Took Forever!

Smart Sensors Are Fixing This

Manufacturing Smart Sensors in Manufacturing

Vibration Sensors

- Monitor Health
- Detect Anomalies
- Predict Failures

- Schedule Maintenance
- Reduce Downtime
- Improve Productivity

Smart Sensors in Manufacturing

Proximity Sensors

- Detect Issues
- Make Realtime Adjustments
- Automatically Correct Misaligned Objects

2

1

Smart Sensors in Manufacturing

Light Sensors

- Detect Ambient Light
- Integrate with Motion Detection
- Automatically Adjust Artificial Lighting
- Significant Energy Savings

3

2

1

Smart Sensors in Manufacturing

Gas Sensors

- Continuously Monitor Air
- Detect Hazardous Gas
- Trigger Ventilation Adjustments

4

3

2

1

Smart Sensors in Manufacturing

pH Sensors

- Adjust Chemical Process
- Improve Product Quality

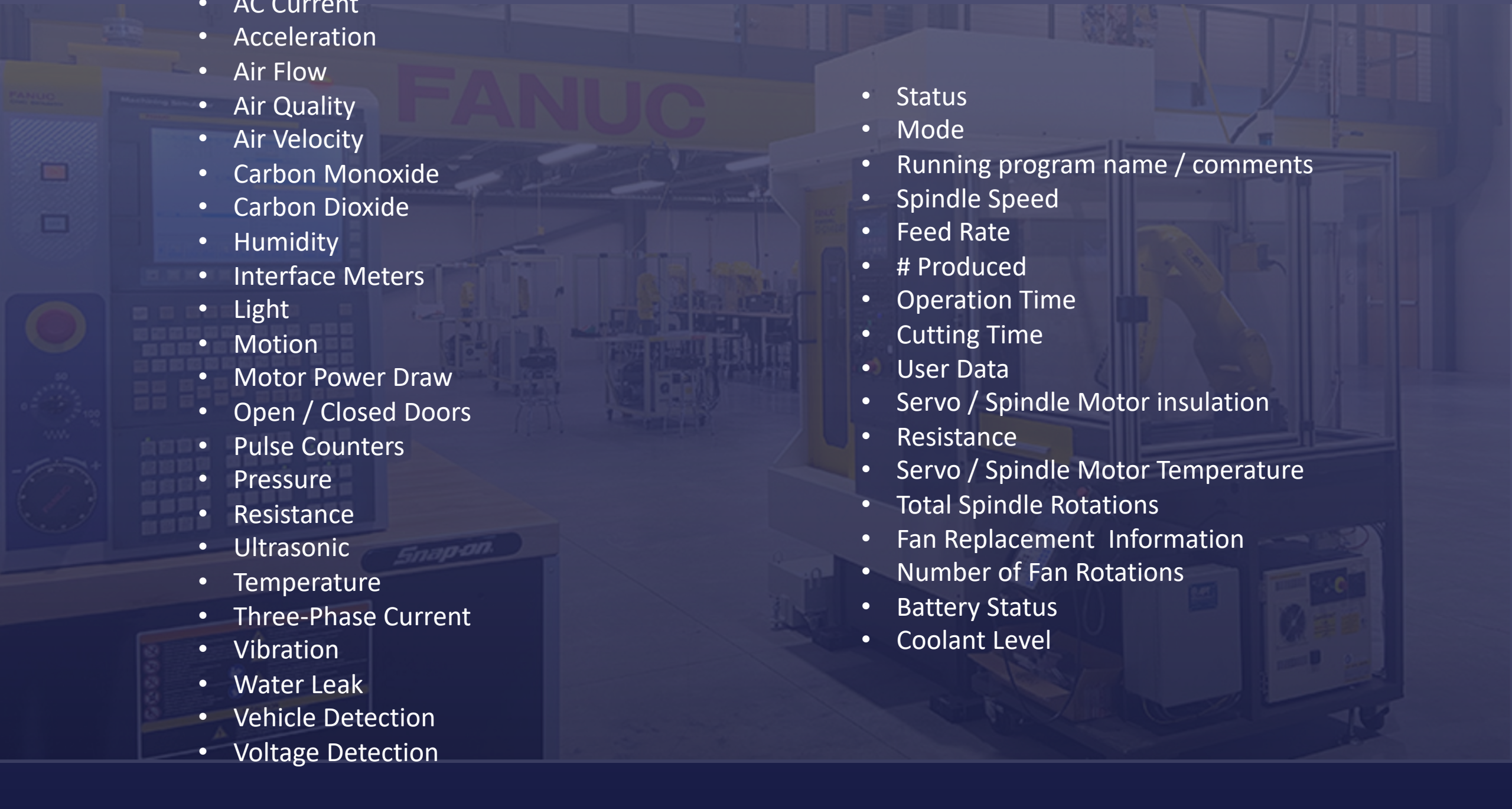
5

4

3

2

1



- AC Current
- Acceleration
- Air Flow
- Air Quality
- Air Velocity
- Carbon Monoxide
- Carbon Dioxide
- Humidity
- Interface Meters
- Light
- Motion
- Motor Power Draw
- Open / Closed Doors
- Pulse Counters
- Pressure
- Resistance
- Ultrasonic
- Temperature
- Three-Phase Current
- Vibration
- Water Leak
- Vehicle Detection
- Voltage Detection

- Status
- Mode
- Running program name / comments
- Spindle Speed
- Feed Rate
- # Produced
- Operation Time
- Cutting Time
- User Data
- Servo / Spindle Motor insulation
- Resistance
- Servo / Spindle Motor Temperature
- Total Spindle Rotations
- Fan Replacement Information
- Number of Fan Rotations
- Battery Status
- Coolant Level

The Cloud

External Data Centers

- CAN COMMUNICATE
- EMBEDDED INTELLIGENCE

The Fog – Networks, Data Collectors, PLC’s

Time
Bandwidth

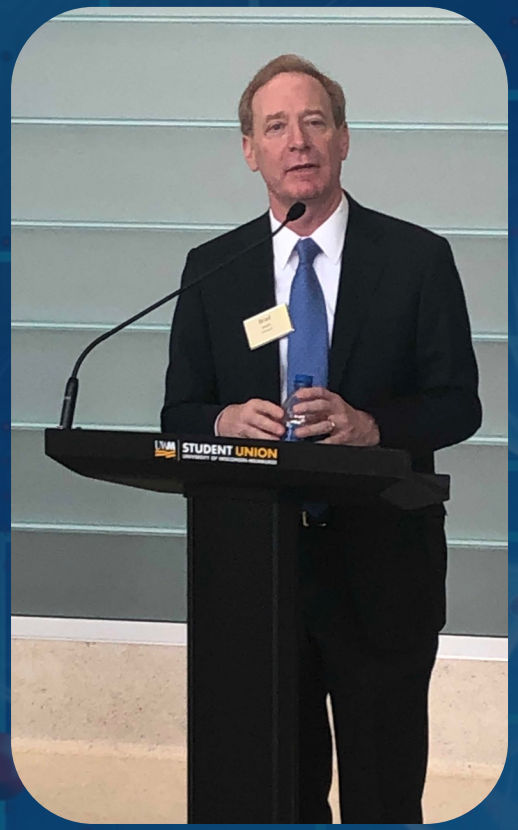
The Edge – Smart Sensors & Devices

Dr. John Carrier
Sloan School of Management
Massachusetts Institute of Technology

Size is decreasing.

We've Seen a Cost Reduction in Smart Sensors of Several orders of Magnitude in the last few years.

Today the cost to buy sensors and connect to an IoT Platform is Less than $100!



"By 2025 75 Billion devices will be connected to the internet. It's a $2.7 trillion market."

AI-DRIVEN LEARNING:

Empowering students, teachers & workers alike

Dr. Rich Barnhouse
President
Waukesha County Technical College

Episode 112
The Tech Ed® Podcast

Share Post Like 0

Pewaukee, February 08, 2024

WCTC announces new applied AI center to focus on emerging technology, strengthen business and industry

PEWAUKEE, Wis. (Thursday, Feb. 8, 2024) – In an effort to strengthen the workforce and economy, and continue to position itself as a leader in artificial intelligence (AI), Waukesha County Technical College is excited to announce the creation of an AI innovation center – the WCTC Applied AI Lab: Wisconsin Center for AI Development and Implementation – slated to open later this year.

We have sensors on EVERYTHING! We gather data on EVERYTHING!

What do you do with the data?

Nothing yet, but I know on my next Continuous Improvement Project my first problem will be that we don't have the data – now I know we'll have the data!

Programming Languages

C++

Java

MATLAB SIMULINK®

python

Application Frameworks

TensorFlow

Microsoft Cognitive Toolkit

PyTorch

Caffe2

Azure

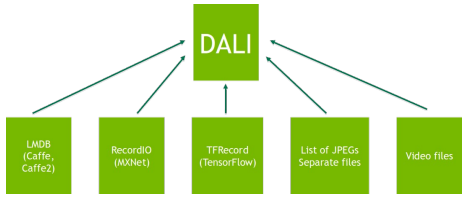
Accord.NET Framework

GPU-accelerated Libraries

NVIDIA CUDA

cuDNN

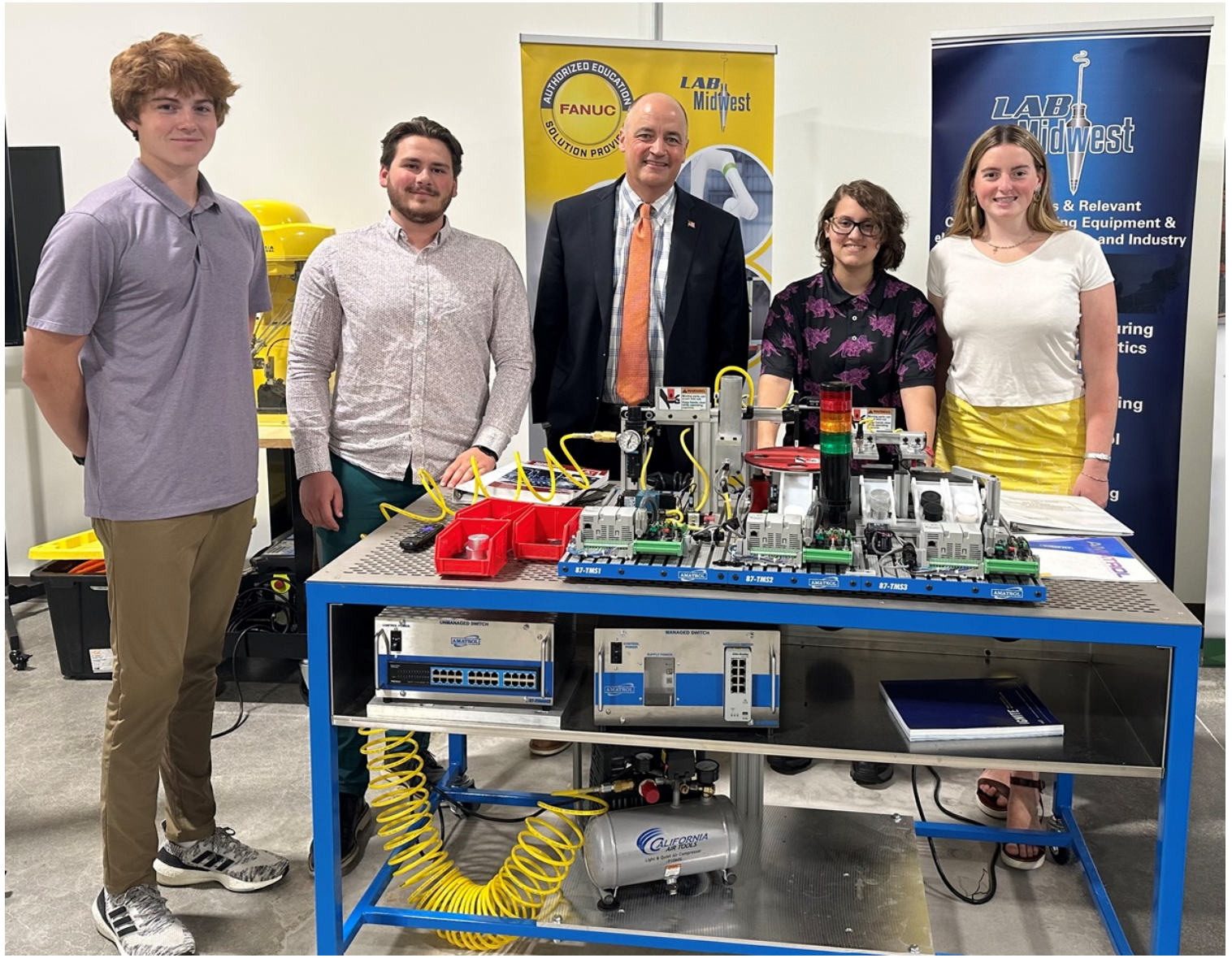
TensorRT



Cloud Deployment

aws

Google Cloud



WCTC WAUKESHA COUNTY TECHNICAL COLLEGE | Hands-on Higher Ed

UNIVERSITY OF NOTRE DAME

WISCONSIN UNIVERSITY OF WISCONSIN-MADISON

HOMESTEAD HIGH SCHOOL

LEHIGH UNIVERSITY

UNIVERSITY of VIRGINIA

UNIVERSITY OF St.Thomas MINNESOTA

MARQUETTE

ATS Midwest

LAB Midwest

The Tech Ed Podcast

TechEd Media Group

MISSION LEARNING SYSTEMS

HEALTH INFORMATICS:

Using data to improve patient care

Dr. Brian Kay
Chief of Staff
Rogers Behavioral Health

Episode 103
The Tech Ed® Podcast

DATA ANALYTICS AND AI ARE ACCELERATING MEDICAL RESEARCH

Dr. Julie Panepinto

Director, Division of Blood Diseases and Resources -
National Heart, Lung and Blood Institute of the National Institutes of Health

Now streaming on

Episode 154

The Tech Ed® Podcast

We see things in the sense that everything has to be smart. And when I say everything has to be smart, it's everything has to be connected and has to be able to provide real-time data so that we can provide more value for the customer, or in the case of a manufacturing operation, for the people that work in that operation...

Every time we produce a product today, we expect that it will be connected, so we'll be able to, or a fleet owner or user of the equipment will be able to get real-time insights because they are working with a connected vehicle or connected machine."

John Pfeifer

President and CEO
Oshkosh Corporation

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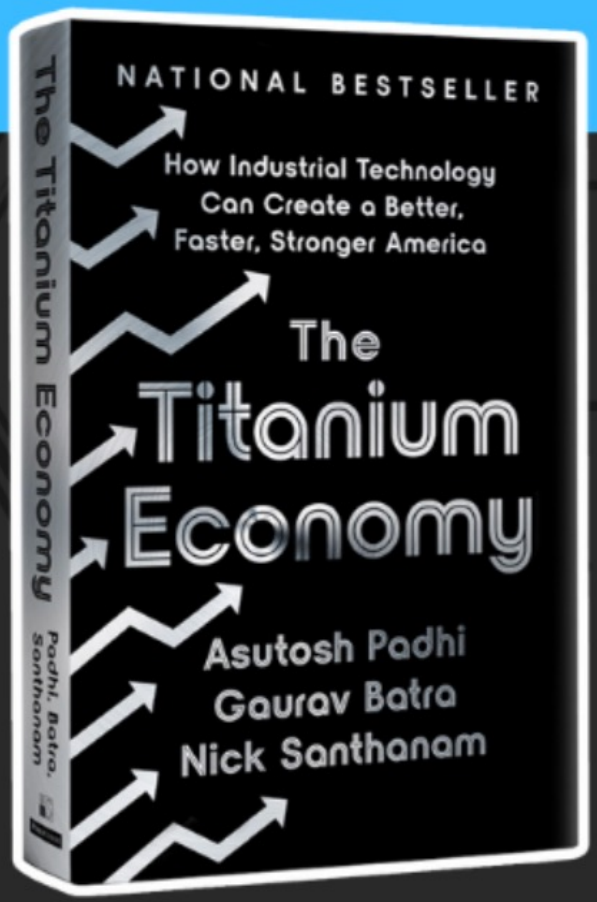
Podcast

THE TITANIUM ECONOMY

The companies you've never heard of that keep America running

Asutosh Padhi

North America Managing Partner
McKinsey & Company



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BREAKING DOWN DATA SILOS:

Why smart manufacturing needs standardization

John Dyck, CEO of CESMII

Episode 139

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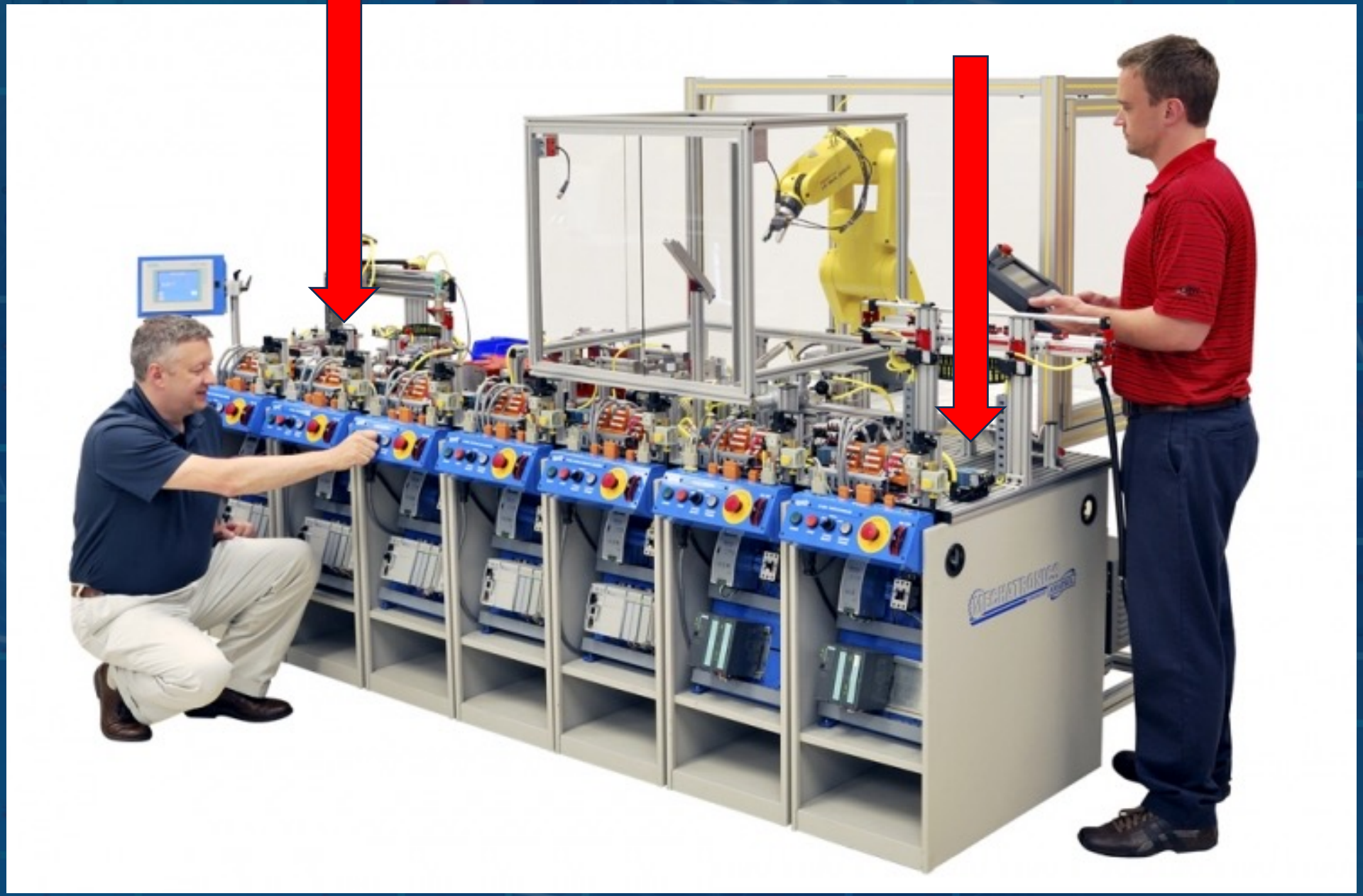
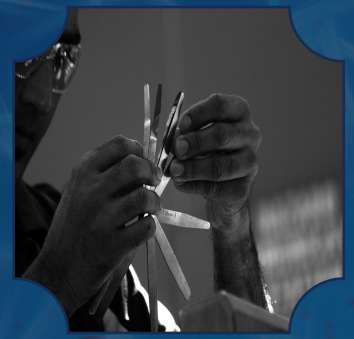




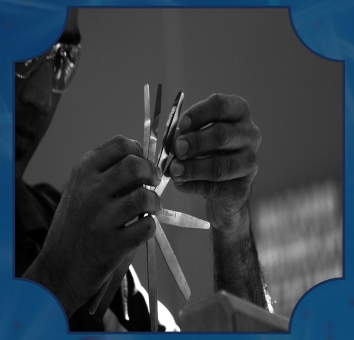



Raw Material

Transportation

Production

Inspection

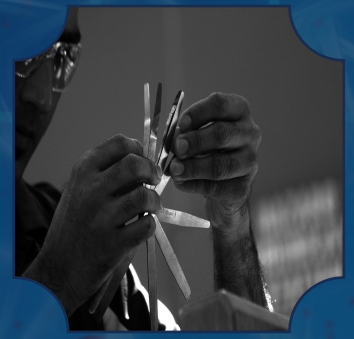


Distribution

Customer

Raw Material

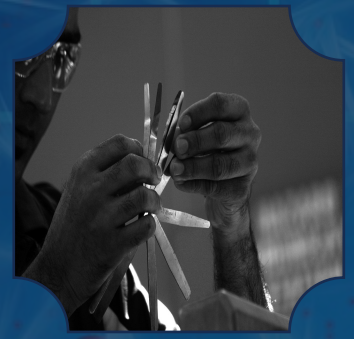


Quantity
Supplier Info
Specifications
Batch #s
Expiration Dates
Delivery
Certifications
Compliance Documents

Raw Material

Transportation



Shipping Schedules
Transport Mode
Carrier
Departure Time
Arrival Time
Temperature
Humidity
Routes
Incidents
Delays

Raw Material

Transportation

Production

Usage
Batch
Lot
Date
Time
Temperature
Pressure
Equipment
Personnel
In Process QC
Deviations
Adjustment

Raw Material

Transportation

Production

Inspection

Test Data
Specification Compliance
Defects
Deviations
Corrective Actions
Packaging
Labeling
Batch
Lot
Certifications
Documentation

Raw Material

Transportation

Production

Inspection

Distribution

Product Descriptions
Quantity
Size
Weight
Packaging
Receipt Date
Ship Date
Ship Location
Carrier
Tracking #
Condition
Damage
Safety Data
Product Certifications

Raw Material

Transportation

Production

Inspection

Distribution

Customer

Receipt Quantity
Specifications
Conformance
Dimensions
Material
Defects
Damage
Deviations
Visual Inpection
Functional Testing
Packaging Integrity
Documentation
Certificates
Sampling
Testing

Raw Material

- Quantity
- Supplier Info
- Specifications
- Batch #s
- Expiration Dates
- Delivery
- Certifications
- Compliance

Transportation

- Shipping Schedules
- Transport Mode
- Carrier
- Departure Time
- Arrival Time
- Temperature
- Humidity
- Routes
- Incidents
- Delays

Production

- Usage
- Batch
- Lot
- Date
- Time
- Temperature
- Pressure
- Equipment
- Personnel
- In Process QC
- Deviations
- Adjustment

Inspection

- Test Data
- Specifications
- Defects
- Deviations
- Corrective Actions
- Packaging
- Labeling
- Batch
- Lot
- Certifications
- Documentation

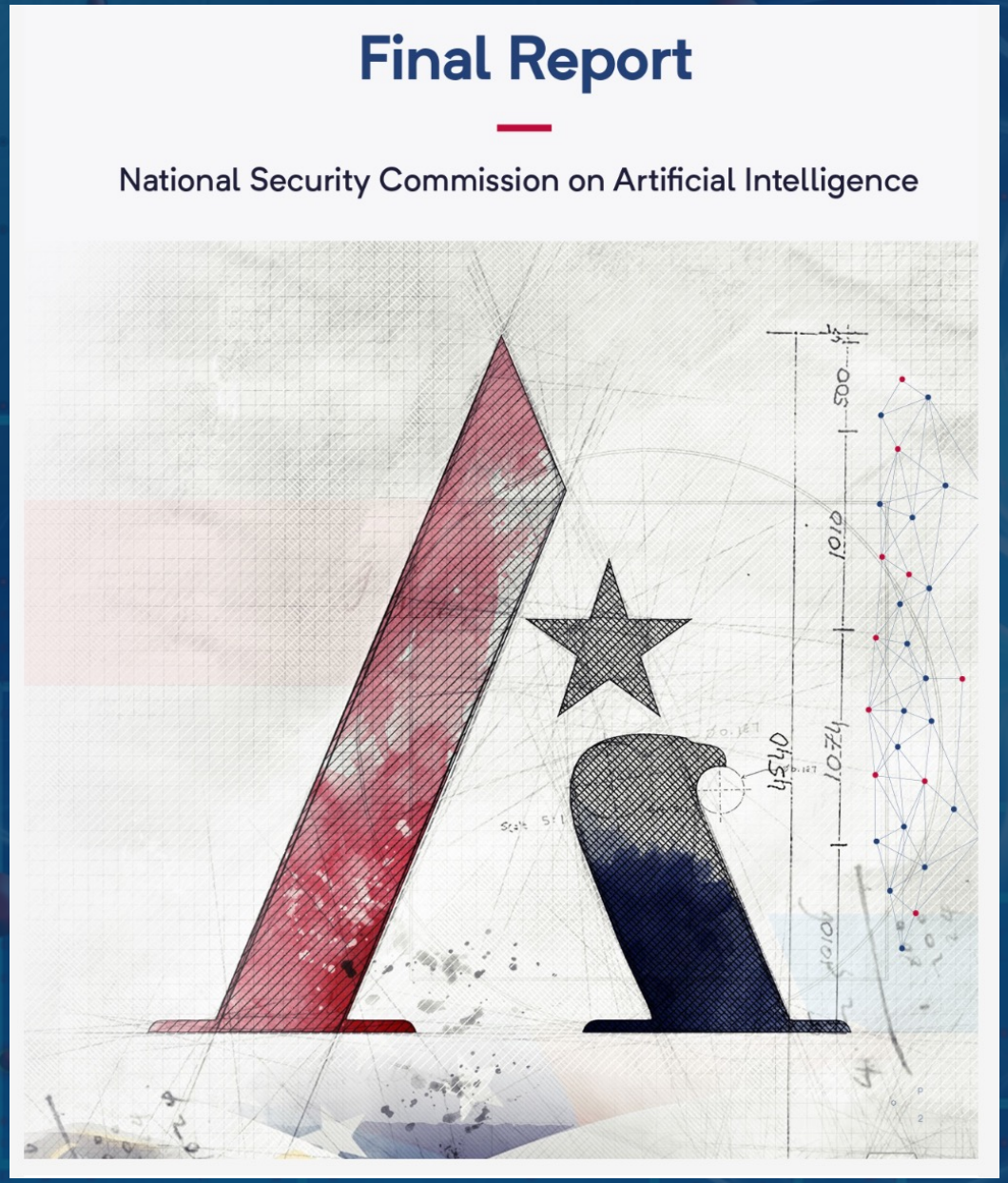
Distribution

- Product Descriptions
- Quantity
- Size
- Weight
- Packaging
- Receipt Date
- Ship Date
- Ship Location
- Carrier
- Tracking #
- Condition
- Damage
- Safety Data
- Certifications

Customer

- Receipt Quantity
- Specifications
- Conformance
- Dimensions
- Material
- Defects
- Damage
- Deviations
- Visual Inpection
- Functional Testing
- Packaging Integrity
- Documentation
- Certificates
- Sampling
- Testing

2,217,600



Appoint a full-time, senior-level Responsible AI lead in each department or agency critical to national security and each branch of the armed services.


DEVELOPING AN AI STRATEGY
Best practices for business leaders
Todd Wanek
CEO - Ashley Furniture Industries
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Just Start