



An APEX Accelerator

Emerging Issues:

Industry 4.0 – The Next Generation of the DIB

September 19 | 11:00 am - Noon

Presented by:

Marc Violante, Wisconsin Procurement Institute



Webinar Etiquette

PLEASE

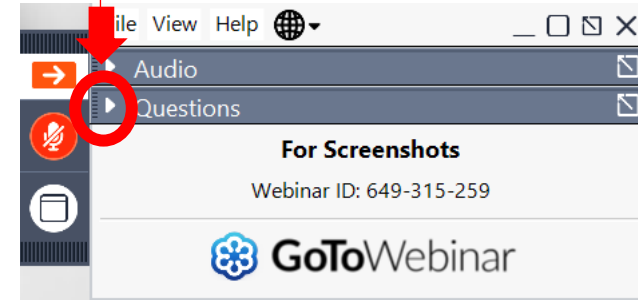
- Log into the GoToWebinar session with the name that you registered with online
- Place your phone or computer on MUTE
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 - We will share the questions with our guest speaker who will respond to the group

THANK YOU!



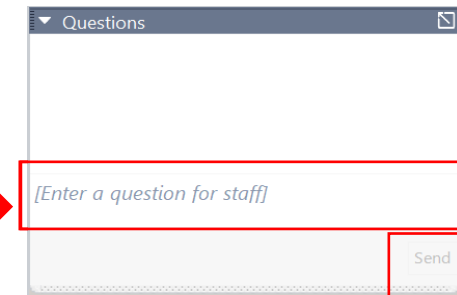
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Assisting Wisconsin businesses compete in the government marketplace.

WPI is Wisconsin's APEX ACCELERATOR

The APEX Accelerators program, under management of the Department of Defense (DOD) Office of Small Business Programs (OSBP), plays a critical role in the Department's efforts to identify and engage with a wide range of businesses entering and participating in the defense supply-chain. The program provides the education and training that all businesses need to participate to become capable of participating in DOD and other government contracts.

WPI provides services to all of Wisconsin's 72 counties

- Individual counseling at our offices, client's facility or virtually
- Small group training – webinars and workshops
- Conferences including one on one buyer meetings – Marketplace, The Contracting Academy, Small Business Academy, Wisconsin Federal Contractor Forum, Acquisition Hour, Cyber Fridays, DOD Roadmap series, Government Opportunities Business Conference, End of Year Federal Contractor Update, Annual DOD Contract Management Update, Evening FAR sessions and more.....

www.wispro.org

WPI OFFICE LOCATIONS

■ MILWAUKEE

- *Technology Innovation Center*

■ MADISON

- *FEED Kitchens*
- *Dane County Latino Chamber of Commerce*
- *Wisconsin Manufacturing Extension Partnership (WMEP)*
- *Madison Area Technical College (MATC)*

■ CAMP DOUGLAS

- *Juneau County Economic Development Corporation (JCEDC)*

■ EAU CLAIRE

- *Western Dairyland*

■ FOND DU LAC

- *Envision Greater Fond du Lac*

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- *NWTC Startup Hub*

■ LACROSSE

- *Veterans in Professions*

■ MANITOWOC

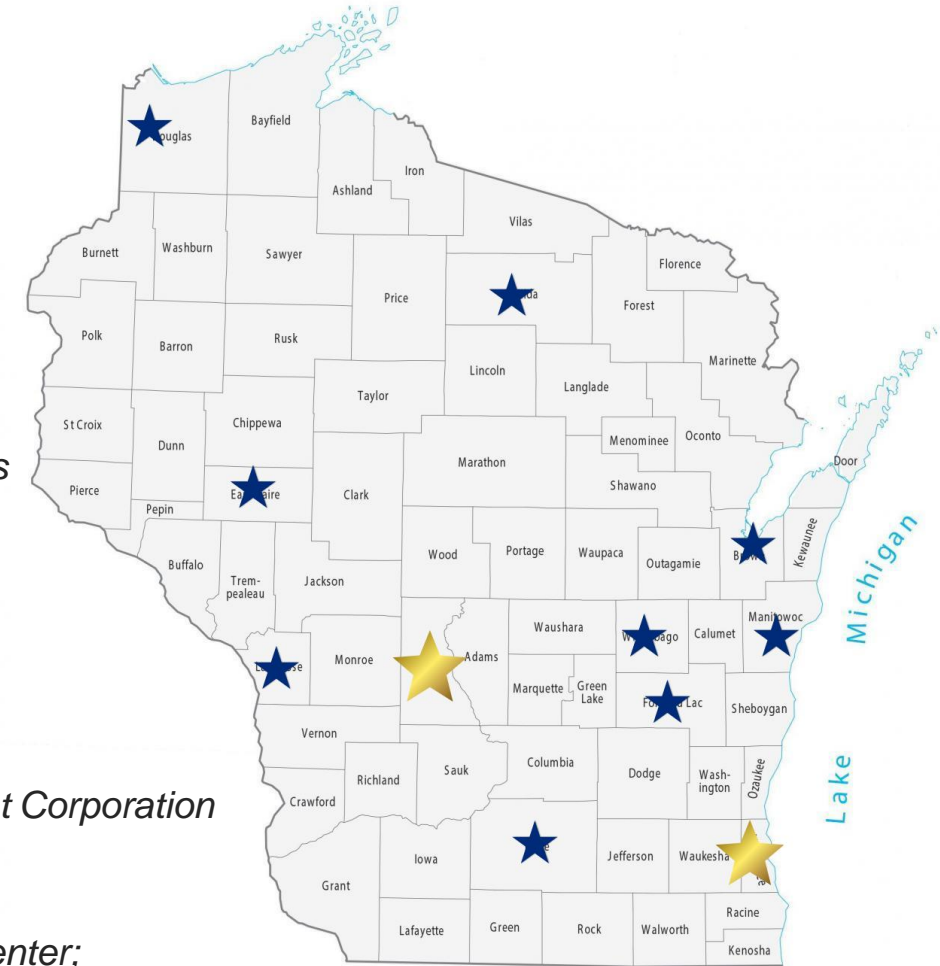
- *Progress Lakeshore*

■ OSHKOSH

- *Greater Oshkosh Economic Development Corporation*

■ SUPERIOR

- *Small Business Dev Center; UW Superior*



APEX ACCELERATORS

WISCONSIN APEX ACCELERATOR



UPCOMING EVENTS

- APR 1:00 pm - 2:00 pm
16 Acquisition Hour: SAM.gov – Tools for Contracting
- APR 9:00 am - 12:00 pm
24 Government Certification Workshop – State Certifications – Madison, WI
- APR 12:00 pm - 1:00 pm
24 Acquisition Hour: Overview of the Contractor Performance Assessment Reporting System (CPARS)
- APR April 30, 2024 - May 3, 2024
30 Lieutenant Governor's Small Business Academy
- MAY 8:00 am - 4:00 pm
16 10th Annual DoD Contract Management Update — Appleton, WI

Industry 4.0 – The Next Generation of the DIB

Marc N. Violante

Wisconsin Procurement Institute

September 19, 2024

In the beginning

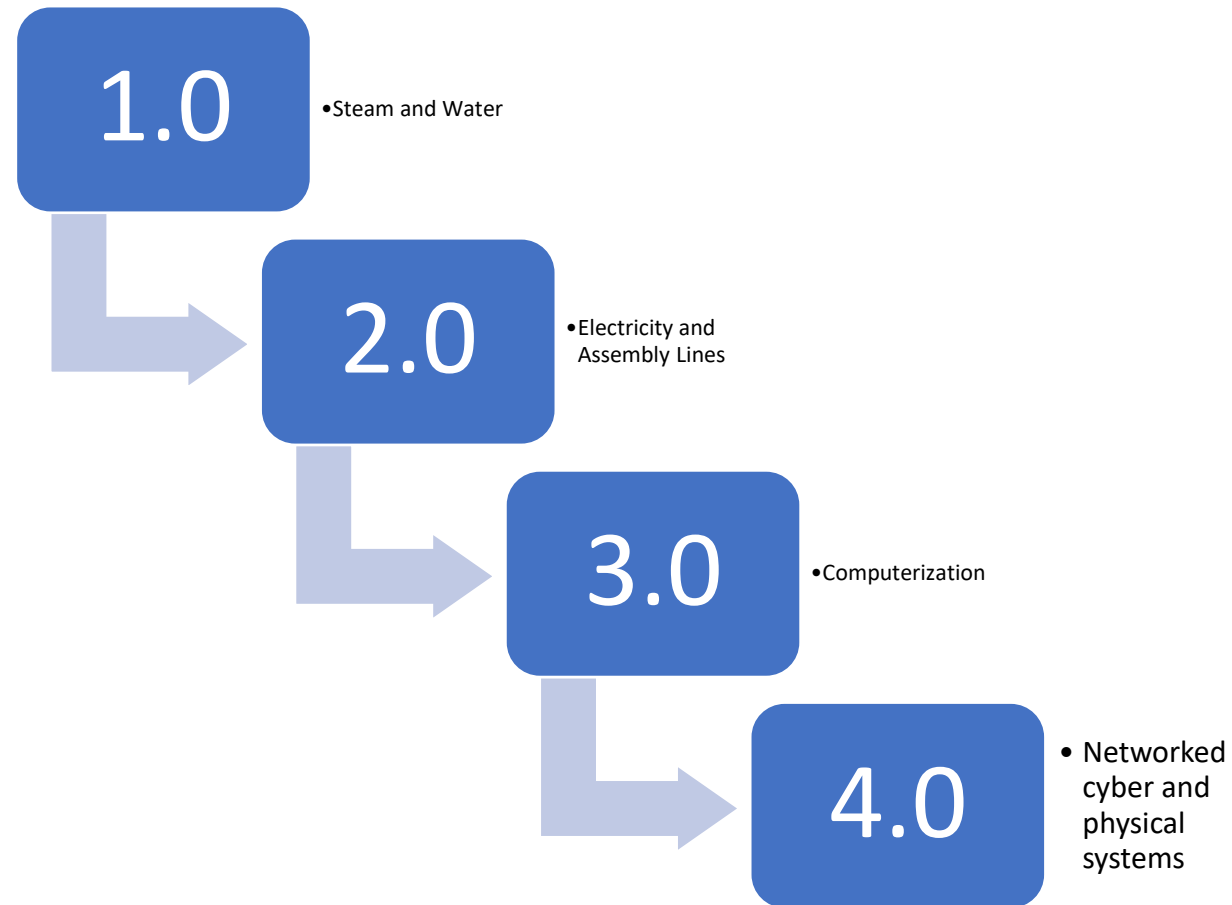


Image: Microsoft Copilot, DALL E 3

The Goal

- In a word –
 - Being profitable
- A need has always been how to do things – faster, better and cheaper.

Industrial Revolutions



<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

What is Industry 4.0?

- Industry 4.0 is characterized by the use of smart, interconnected technologies to transform manufacturing. As described by the [World Economic Forum](#), the rapid evolution and adoption of Industry 4.0 heralds the transformation of entire systems of production, management, and governance.

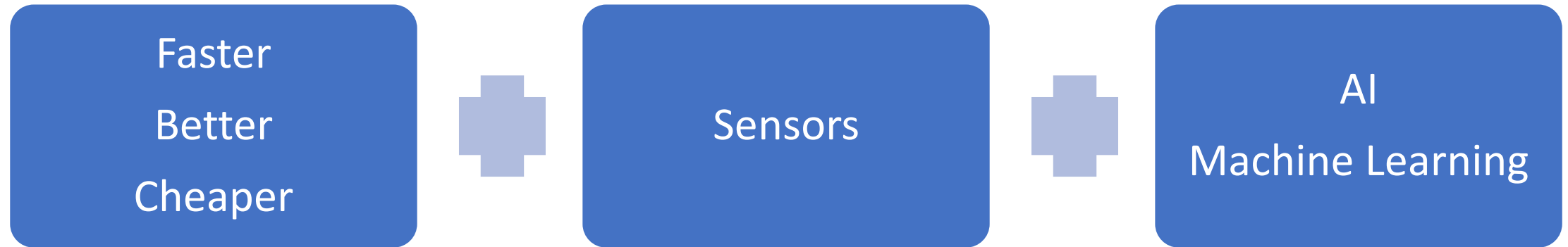
<https://aws.amazon.com/blogs/smb/a-small-and-medium-business-guide-to-industry-4-0-what-it-is-and-why-it-matters/>

Industry 4.0

- now computers mingle with the physical, digital, and biological worlds to create smart machines, interconnected devices, artificial intelligence, and machine learning. From interconnected supply chains to intelligent robots and predictive maintenance, this new revolution requires that everyone rethink their businesses. **It will impact all disciplines, economies, and industries.**

<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

Industry 4.0



Impact on machine up-time

- but they can also keep systems running
 - thanks to sensors on machines that provide predictive maintenance (**capable of sending alerts of potential equipment failure** so humans can intervene before factory lines need to be down).
 - By gathering and processing big data, machines can identify opportunities to improve operations, troubleshoot issues quicker than humans are able to process the same information.
 - The reality of real-time analysis and communication throughout operations enables quicker optimization of the entire system.

<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

Industry 4.0's goal

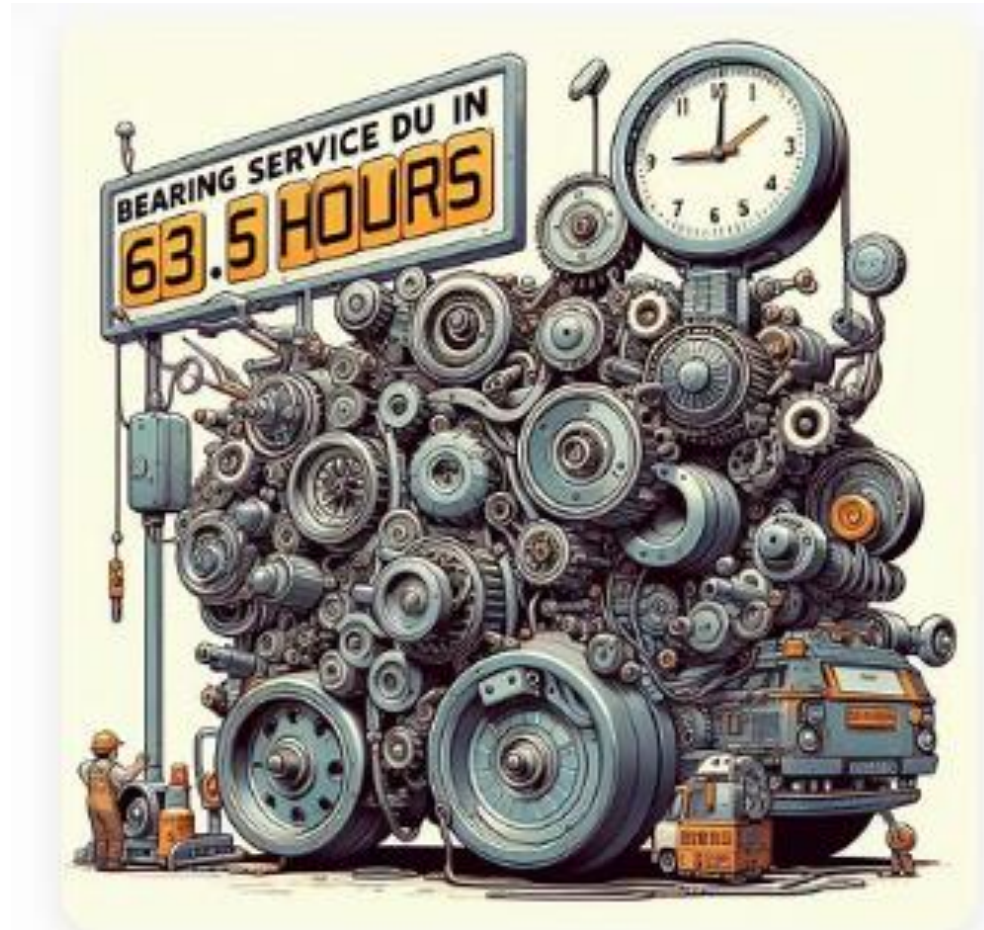


Image: Microsoft Copilot, DALL E 3

General business needs

- Customers – contracts
- Resources
- Assets
- Funding
- Equipment
- Workforce – skilled, trained, knowledgeable
- Robots - cobots

How to approach Industry 4.0

- How will it solve a relevant business problem?
- How will it support company goals?

Industry 4.0 technologies

- Augmented reality and virtual reality
- Big data and artificial intelligence
- Robotics and automation
- Additive manufacturing
- Simulation
- System integration
- Cloud computing
- Internet of Things
- Cybersecurity
- System integration
- Cloud computing
- Internet of Things
- Cybersecurity

Acquiring new technology is not enough

- It has to be implemented intentionally. – set goals - examples
 - Optimizing processes
 - Shortening cycle times
 - Improving quality
 - Reducing energy losses
 - Shortening downtimes
 - Improving overall equipment effectiveness

Industry 4.0 – structural elements

- Business practices
- Enabling technology
- Workforce development

Identify People, Tools, Processes, and Changes

Solutions to problems typically fall into four categories:

1. **People:** Hiring the right people and training them to do their best work
2. **Tools:** Equipping your workforce with the best tools and training employees to use them
3. **Processes:** Mapping out your processes, from the moment an idea is formed until it is delivered to a customer
4. **Environment:** Identifying cultural or environmental changes that need to take place to accommodate technology, people, tools, and processes to improve your organization

<https://www.purdueglobal.edu/education-partnerships/fourth-industrial-revolution-is-your-workforce-ready/>

Industry 4.0 - Benefits

- Productivity/Greater Efficiency
- Reduce Operating Costs
- Growth
- Changes the Business Model
- Customer Satisfaction

<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

New Technologies Mean New Federal Workflows

- “This is why: In an Industry 4.0 world, **a product is less a product than it is a technology ecosystem**. Certain capabilities once performed by humans in the design and manufacturing process may be automated. Manufacturing facilities themselves may be automated or connected to outside networks; HVAC systems, for example, may report changes in temperature or energy usage to an offsite vendor or a utility company.”
- “These new methods promise upgraded readiness and effectiveness across all agencies. The ingrained automation and more accessible technology should make it easier to use, even for a team with gaps in its IT knowledge.”

<https://fedtechmagazine.com/article/2022/06/why-industry-40-practices-will-matter-federal-government>

The Goal – DoD / US Army

- DETROIT ARSENAL, Mich. – July 7, 2023
- How do you modernize an industry?
- How do you take words on legislation and turn them into a lean and efficient supply chain that provides for the Army's ever-present logistical needs?
- These are the questions that U.S. Army Tank-automotive and Armaments Command's leadership faces as modernization continues to top Army priorities.

https://www.army.mil/article/268177/the_right_conversations_tacom_at_lift_technologies

The Idea

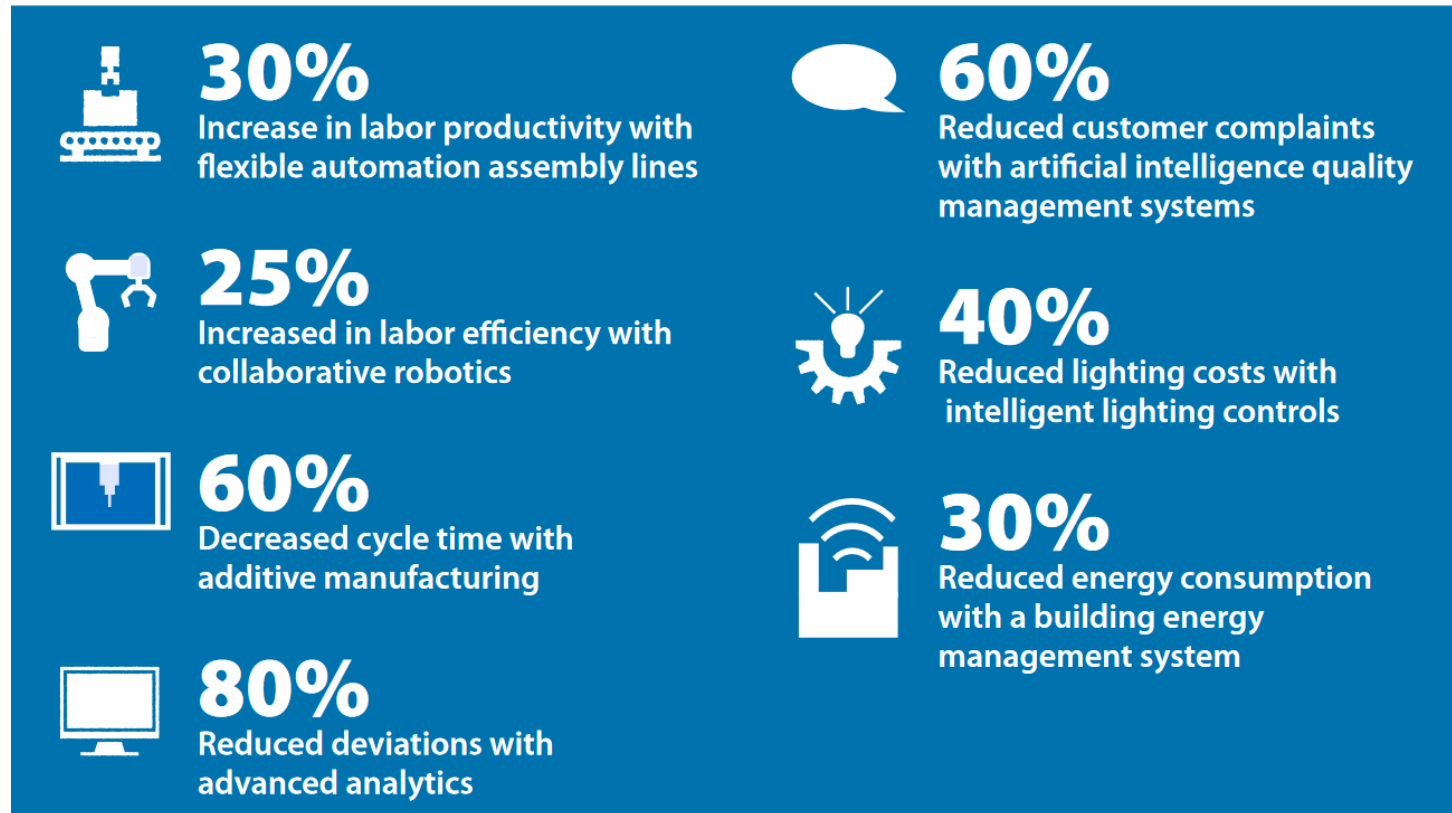
- LIFT Chief Development Officer Sean Conway explains, are often collectively referred to as “Industry 4.0/Smart Manufacturing.”
- The idea behind smart manufacturing is that advanced technologies could be used to optimize industrial manufacturing capabilities to a degree previously unattainable.
- “We need new solutions, new thinking to overcome the problems each of you see every day. This is our opportunity to achieve the type of manufacturing efficiency and innovation that the Army is actively seeking as it continues its OIB modernization efforts.”
- Noting the promise of incorporating more digital assets into the manufacturing within TACOM’s arsenals and depots, Werner commented that the need for modernization in the Army’s industrial base was paramount. “We can’t rely on what we’ve always done. We have to foster new ideas and change the way we do business.”

Merging Technical Capabilities Means More Accurate Communication

- These new capabilities enable agencies to collect real-time, real-world information on the status and location of their people, their assets, their equipment and their infrastructure and know exactly how ready they are for their next mission, whether it's a military deployment or civilian disaster relief.

<https://fedtechmagazine.com/article/2022/06/why-industry-40-practices-will-matter-federal-government>

What can Industry 4.0 do for you?

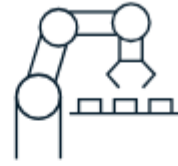


Example areas of value potential in Industry 4.0 (factory network)



Data, computational power, connectivity

- Blockchain
- Cloud technology
- Internet of Things
- Sensors



Human-machine interaction

- Virtual and augmented reality
- Robotics and automation (collaborative robots, automated guided vehicles)
- Robotic process automation, chatbots



Analytics and intelligence

- Automation of knowledge work
- Big data, advanced analytics, and AI



Advanced production methods

- Additive manufacturing (including 3-D printing)
- Renewable energy

<https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero>

The Dichotomy

While digital transformations are notoriously difficult to scale up across networks of factories, the pressure to succeed is intense. Companies at the front of the pack are capturing benefits across the entire manufacturing value chain.

<https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero>

The Good News

*The good news is that technology adoption isn't all or nothing.
There are low cost, easy-to-implement technologies
that can drastically increase your productivity.*

Advance of Robotics

- “Automation is fundamentally changing industries and workplaces. The International Federation of Robotics predicts that in a decade, more than half of production operators will be working with robots. Big companies? They’re already there, harnessing advanced technology and optimizing their output. Small and medium-sized enterprises (SMEs)? Not so much.”

<https://hbr.org/2023/11/a-new-generation-of-robots-can-help-small-manufacturers>

Cobots – friend or foe?

- “Cobots can help companies maintain productivity in the face of labor and skills shortages, and by taking on the grunt work, they also create better workplaces for people, which in turn boosts retention and reduces the risk of injury. That’s golden, especially **when you consider our aging workforce. Physical stress is one reason many over 50s opt for early retirement, so creating new work pathways with less physically intense work** opens the possibility of holding on to valuable experience.”

<https://hbr.org/2023/11/a-new-generation-of-robots-can-help-small-manufacturers>

Looming threat -Workforce

- **Navy awards BlueForge Alliance new \$950M contract to boost sub industrial base**
- In total, the Navy has awarded BlueForge roughly \$1.3 billion in work associated with boosting the submarine industrial base.
- WASHINGTON — The Navy on Tuesday awarded BlueForge Alliance a \$950 million contract to continue its efforts in bolstering the submarine industrial base (SIB) in the United States in preparation for the work necessary to carry out the [AUKUS security pact](#).
- “This contract will execute ongoing critical efforts to strengthen and expand the SIB and provides a direct contractual arrangement with a strong partner with demonstrated experience driving enhanced capability and capacity,” a Navy spokesperson told Breaking Defense.
- <http://breakingdefense.com/2024/09/navy-awards-blueforge-alliance-new-950m-contract-to-boost-sub-industrial-base/>

Workforce issues are critical to success

- “manufacturing especially is having huge problems recruiting and retaining employees. **More than 2 million manufacturing jobs will sit unfilled across the United States by the end of this decade**, and three-quarters of European companies already have difficulty recruiting suitable workers. Workplaces are crying out for talent and face decreased productivity and unsustainable staff turnover.”

Skilled Workforce

- Addressing the threat that an aging and shrinking manufacturing workforce poses to U.S. national security, IBAS has invested approximately \$130 million across 16 unique workforce-related projects since the launch of its National Imperative for Industrial Skills initiative in 2020.
- NIIIS aims to create an enduring, national public-private response to build a robust industrial skills workforce development ecosystem.
- Additionally, the Defense Department program focuses on developing trade skills through national competitions, 'Project MFG,' will host the next round of welding competitions at the Philadelphia Navy Yard.

<https://www.acq.osd.mil/news/office-news/indpol/2022/us-manufacturing-ecosystem-key-to-economic-growth-innovation-competitiveness.html>

Efficiency v. Flexibility

- “There’s also a lesser-known reason. Picture this: a bustling small-scale manufacturer, churning out a diverse range of products but in modest quantities. Here’s the hiccup — shifting traditional robots from one task to another isn’t easy. **We’re talking days or weeks of reprogramming**, and that’s if you’re even equipped to tweak them in-house. While they might ramp-up efficiency, they often trade it off for flexibility. The game is essentially zero-sum, especially in businesses that thrive on variety.”

<https://hbr.org/2023/11/a-new-generation-of-robots-can-help-small-manufacturers>

Flexibility is key

- a Wisconsin-based contract machining and fabrication company, got thrown a curveball when a large customer order was unexpectedly cancelled on the same day they received their new cobot-based machine tending system specifically designed for that order. Local integrator PCC Robotics stepped in giving the cobot a quick makeover with some reprogramming and 3D-printed grippers, which allowed the company to run a variety of different parts on the system. Thanks to that, the company could automate CNC machine tasks, which gave employees the chance to tackle more valuable and interesting work.

<https://hbr.org/2023/11/a-new-generation-of-robots-can-help-small-manufacturers>

Industry 4.0 – adopt or not

- Industry 4.0 is here – NOW!
- “If you don’t adopt these technologies that result in being more productive, create less waste, and that improve products and customer service, it won’t be long before your business loses relevancy.”

<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

It's no longer a matter of - IF

- The insights made possible by the 4th Industrial Revolution can shine a light on improvement in every facet of the business, including the customer experience. A business powered with Industry 4.0 technologies can be responsive to its customers in a way that traditional businesses cannot. The customer experience and customer engagement can be enhanced by deploying virtual and augmented reality solutions and other Industry 4.0 technologies.
- It's no longer a matter of if you will add these technologies to your operation; it's a matter of survival and competitive advantage.

<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

Changing business models

- The enormous amounts of data tracked and collected can create insights on ways to create new and smarter products and services.
- It's causing businesses to add services to their products (product-service system), making a product's lifecycle more holistic.
- **Today and tomorrow's business model** needs to be holistic, fast, and flexible using Industry 4.0 technologies to make that possible. Innovation is propelled by using the power of smart machines in the 4th Industrial Revolution.

<https://bernardmarr.com/why-should-businesses-adopt-industry-4-0-technologies/>

A plan to address challenges and improve optimization

- To address challenges and improve optimization in robotics, a small manufacturing company can consider **the following reasons on why turning to robotics is beneficial:**

Labor shortages, fluctuating material availability and costs, and progressively tighter customer quality standards drive small manufacturers to automate more of their shop floor operations.

<https://www.roboticstomorrow.com/story/2024/04/how-small-manufacturers-are-building-a-business-case-for-robotics/22342/>

Industry 4.0 is not an all or nothing proposition

- Even if your company is not ready to take a full plunge into Industry 4.0, you can test the waters.
- Assess the current state of your operations.
- Understand and prioritize your business needs.
- Learn about and try out available opportunities.
- Set goals.
- Build the blueprint.
- Use your current equipment.
- Start Small.
- Build on success and gain buy in.

To Invest or Not to Invest – that is the question

- Build a Business Case

Moving forward to Industry 4.0

- Assess the current state of your operations
- Understand and prioritize your business needs
- Learn about and try out available opportunities
- Set goals
- Build the blueprint
- Use current equipment
- Start small
- Build on success and gain buy in

MANUFACTURERS' GUIDE TO INDUSTRY 4.0 TECHNOLOGIES, pages 3-4

Business case general metrics

$$\text{Return on Investment} = \frac{\text{Incremental Gains}}{\text{Total Investment}} \quad (\text{expressed as \%})$$

$$\text{Payback Period} = \frac{\text{Total Investment}}{\text{Annual Incremental Gains}} \quad \left(\frac{\text{expressed as years}}{\text{by 12 for months}} \right)$$

Identify the benefits

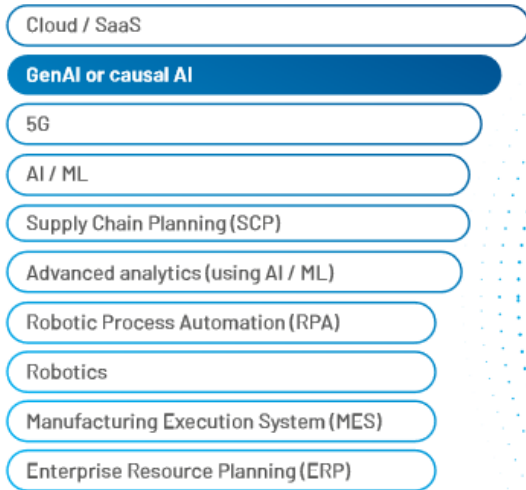
QUANTITATIVE BENEFITS	QUALITATIVE BENEFITS
Increased production	Employee satisfaction
Reduced scrap rate and quality improvements	Worker retention
Reallocated labor hours	Attracting best talent
Reduced labor hours at the process level	Being seen as a technology forward company
Safety improvements such as reduced workers' compensation claims	Keeping an edge over competition
Increased utilization	General safety improvements
Work in progress (WIP) and cycle time reduction	Production and lot tracking

Employee – considerations / preparation

- Include and empower your employees early
- Get ahead of employee anxiety
- Engage employees with skills development
- Identify an Industry 4.0 champion at your company
- Let go of old processes
- Embrace a new mindset

The AI value proposition

BIGGEST ROI

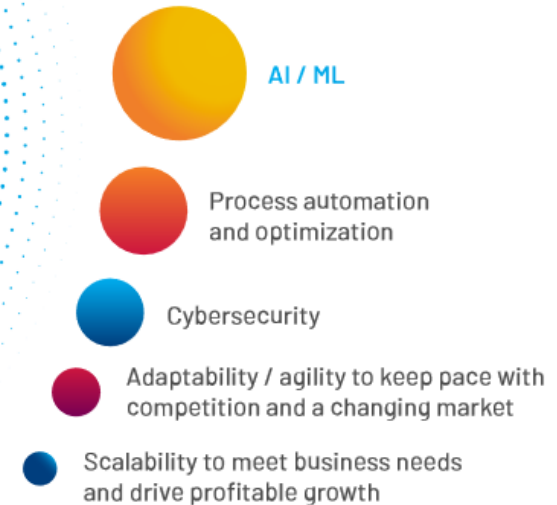


Q. Which of the technologies that your company has invested in had the biggest ROI over the last 12 months? Select top 3. Base: 1562

Results show that AI is core to technology strategies and roadmaps. Adopters are seeing tangible results, with only Cloud / SaaS delivering more ROI than GenAI and causal AI.

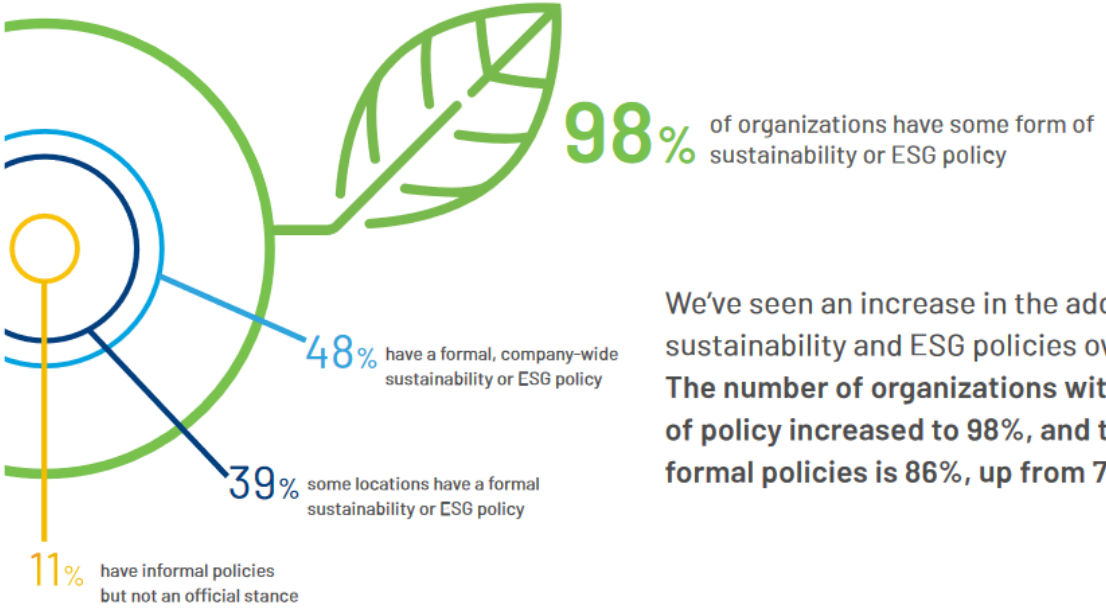
AI / ML deliver bigger business outcomes than all other smart manufacturing capabilities.

CAPABILITIES THAT DELIVER OUTCOMES



Q. What smart manufacturing features / capabilities do you think drive the biggest business outcomes? Select all that apply. Base: 1567

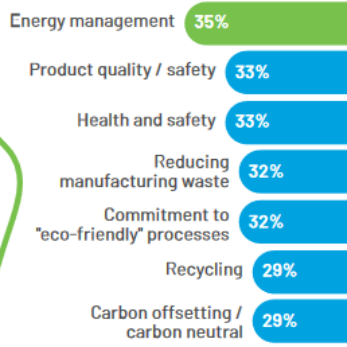
Determine what matters



We've seen an increase in the adoption of sustainability and ESG policies over the last year. **The number of organizations with some form of policy increased to 98%, and those with formal policies is 86%, up from 78% in 2023.**

Q. Which of the following best describes your organization's current efforts around sustainability / ESG (Environmental, Social, and Governance)? Select one. Base: 1567

WHAT MATTERS MOST FOR 2024



Q. What matters most to your organization's sustainability / ESG policy? Select all that apply. Base: 1567

Unifying and connecting people, data, and assets > impact

- **Collaborative Design Platforms**
- **Predictive maintenance**
- **Supply chain optimization**
- **Agile manufacturing**
- **Quality Control and Defect Detection**
- **Circular Economy Practices**
- **Carbon Footprint Monitoring and Optimization**



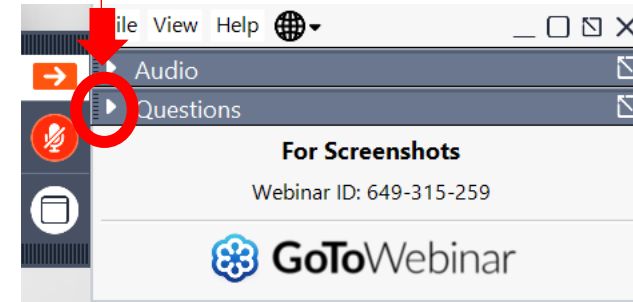
<https://www.sap.com/products/scm/industry-4-0/what-is-industry-4-0.html>

QUESTIONS?



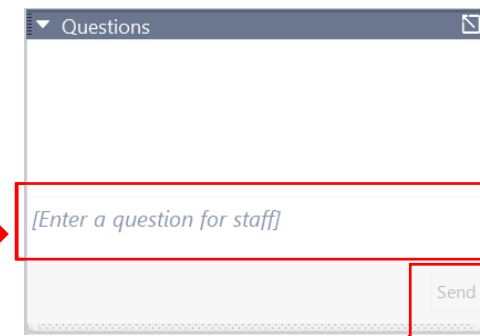
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Click Send when ready to submit a question



UPCOMING TRAINING - EVENTS

CYBER FRIDAY LIVE WEBINAR SERIES

Cyber Friday is a series of one-hour webinars focusing on critical topics for DOD contractors and subcontractors in cyber security, data security, and CMMC. Attendees receive 1 CPE credit for attending.

- **September 20**, 3.1.6 Incident Response Policy, Incident Response Plan
- **October 18**, 3.1.7 System Maintenance Policy
- **November 22**, 3.1.8 Media Control Policy, Media Destruction Policy and Personnel Security
- **January 24**, 3.1.11 Risk Assessment Policy, Security Assessment Reports

EMERGING ISSUES WEBINAR SERIES

This series is intended as an information tool and resource for contract managers and those with a compliance function. Attendees receive 1 CPE credit for attending.

- ~~Aug 22 – Regulation Making – The Process and the Important Role Businesses Play~~
- **Sep 19** – Industry 4.0 – The Next Generation of the DIB
- **Oct 24** – Innovation – What Does Innovation Look Like from DoD’s Perspective?
- **Nov 21** – The Critical Role Your Accounting System Plays in SBIR/STTR Success

- Save the Date -



**The
Contracting
Academy**

*Developing and Growing
Government Contractors*

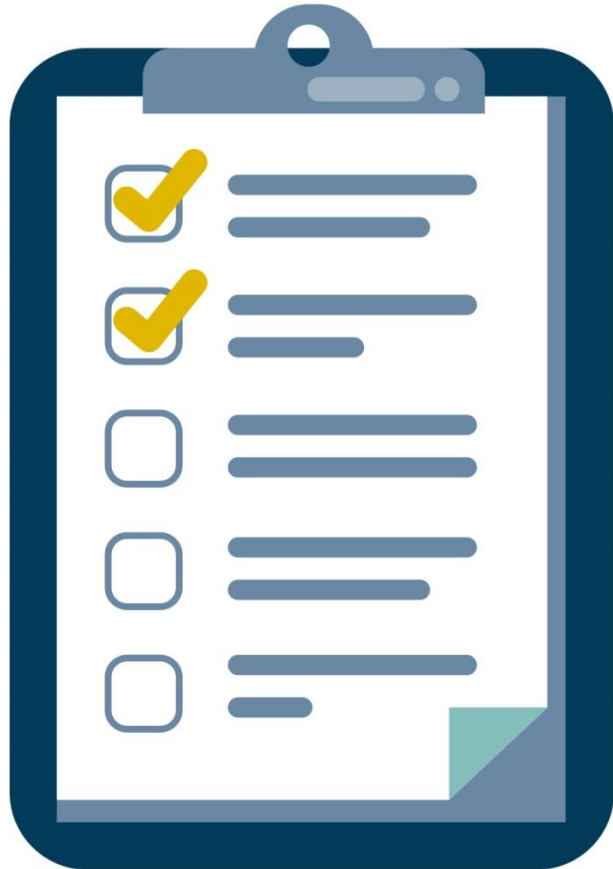
Dec 10

Virtual | 9:00 am - 4:00 pm

The Contracting Academy (TCA) is an opportunity for businesses to grow their technical knowledge of contracting with Federal Government, State/Local Government, and Government Prime Contractors. The series of workshops will benefit established businesses looking to grow and develop their government sales.

...More information and registrations at wispro.org/events

SURVEY



September 19, 2024

CONTINUING PROFESSIONAL EDUCATION



This webinar is eligible for 1 CPE credit.
For a certificate of this credit please contact:

Neelu Patil

neelagangap@wispro.org

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