



How AI Is Reinventing Manufacturing

FORV/S

Your Presenters



Chris Ricchiuto

Partner

Industry Consulting Leader



Ryan Kauzlick

Director

Insights & Automation



Kathryn Schneider

Director

Business Technology Solutions



Learning Objectives

- Gain an understanding of AI, why now, & its impact on the manufacturing industry
- Identify the benefits & practical uses of AI in manufacturing
- Describe current capabilities & future trends

“Generative AI is the new electricity.”

– Andrew Ng, Stanford Professor, Chief Scientist

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Understanding AI

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Polling

Question 1

Are you currently using AI technology at work?

Yes

No

Artificial AI Intelligence

1950s

The concept of artificial intelligence is introduced, & early neural network research begins

1997

IBM's Deep Blue defeats world chess champion Garry Kasparov

2011

IBM's Watson defeats human champions on the game show Jeopardy

2014

Facebook develops the deep learning facial recognition DeepFace

1987



St. Lucy's 8th Grade Science Fair winner
"A peak into AI"

1995

First self-driving car was successfully piloted by The Robotics Institute at Carnegie Mellon

2011–2014

Apple & Amazon incorporate Virtual Assistants Siri & Alexa

2022

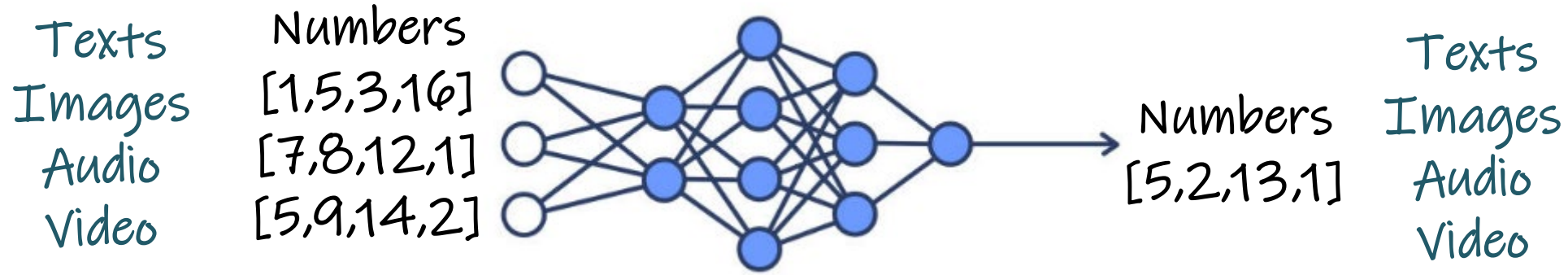
ChatGPT – November
OpenAI releases a free, general purpose generative AI chatbot to the public

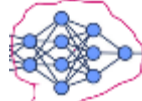
Generative AI

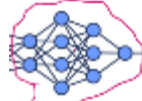
Generative AI

LLM Large Language Models

How it works



Sharks are →  → fish

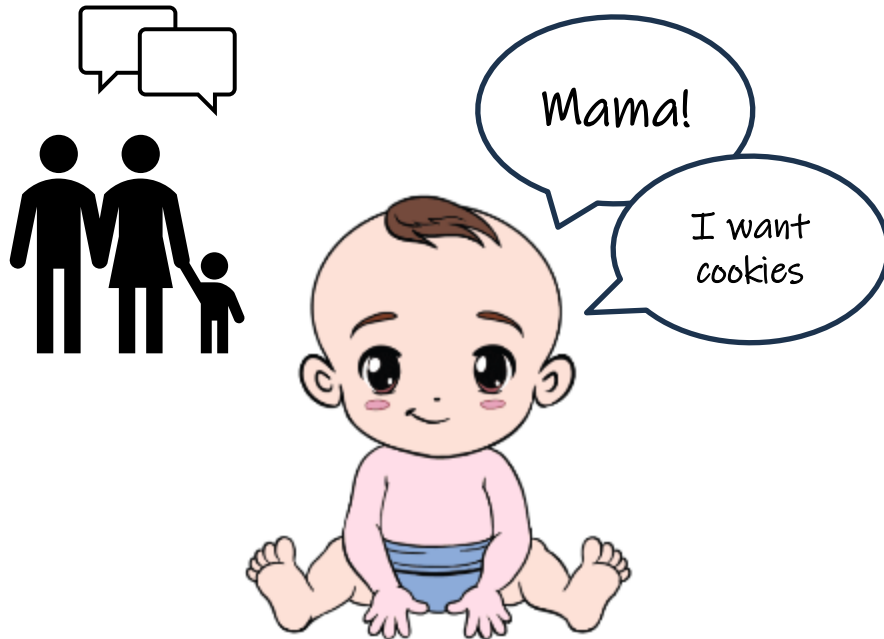
Sharks are fish →  → that are carnivores

Sharks are fish that are carnivores ...

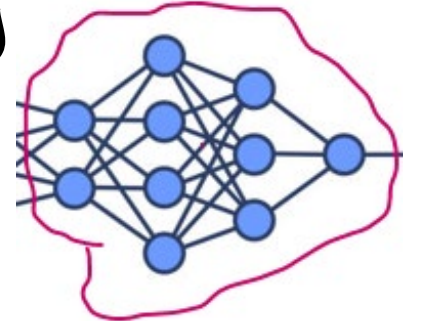
Generative AI

LLM Large Language Models

How it works



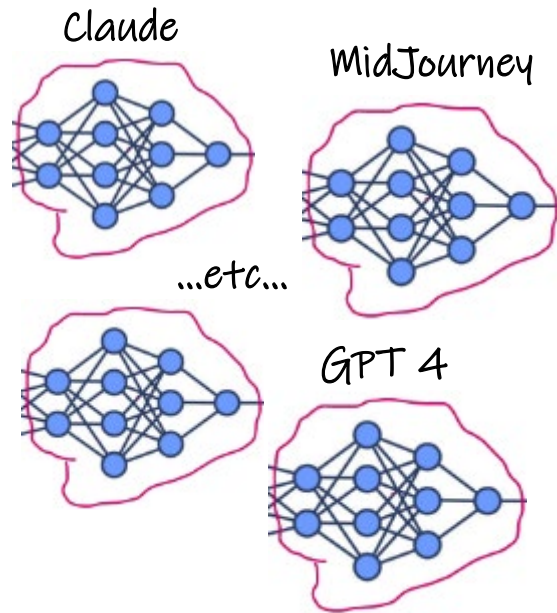
1. Unsupervised pretraining
(lots + lots of text)



2. Supervised training
(reinforcement learning with human feedback)
Once the model is trained, it is "frozen," as a
pretrained model

Generative AI

Models
Models
Everywhere



Speed



Capability



Cost



Public vs. Private



www.theresanaiforthat.com



Why Now?

The Role of Artificial Intelligence

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The Age of AI

Fast Revolution

Slow Revolutions

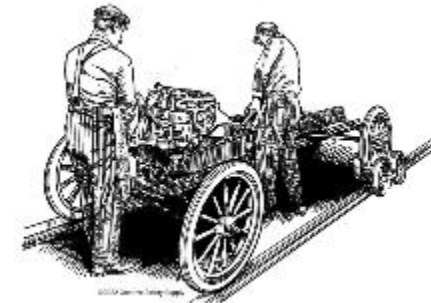
Capability

AI

Human
Intelligence

Time

Computers = 80 years



Generative AI

Will humans still
be needed?

The Role of Humans

- Deciding what to ask & how
- Providing context
- Evaluating results
- Governance & compliance
- Security & data mgmt.
- Filling in the gaps

The Role of AI

- Your personal assistant
- Ask for help?

I work as a CFO; how can you help me?

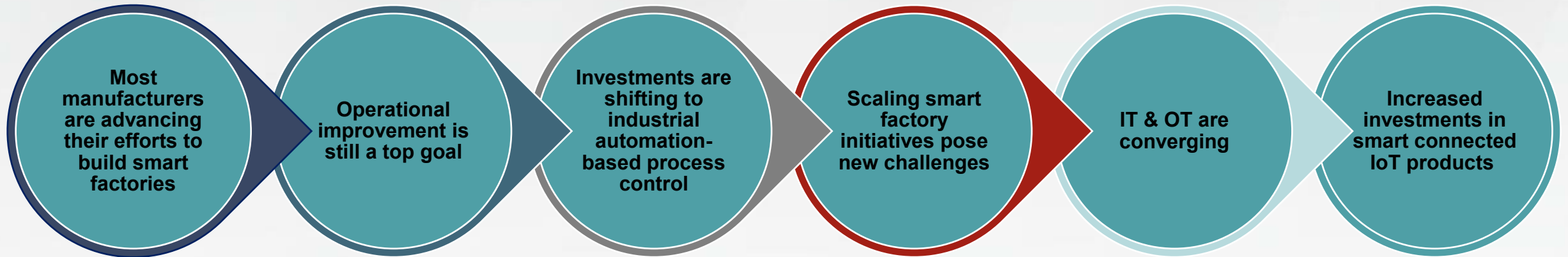


Impact on Manufacturing

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Key Digital Transformation & IoT Manufacturing Trends

Survey of 500 decision makers in discrete, hybrid, or process manufacturing across North America, Europe, & Asia Pacific¹



Which technology trend in manufacturing are you most excited about?

- Predictive Maintenance
- Generative Design
- AI-Powered Materials Forecasting
- Self-Optimizing Machines

Digital Supply Chain

Focus on providing **value** creation for our clients



PLANNING

Strategy / Planning /
Governance / R&D

Process & Technology Infrastructure

Support Functions / Finance / Accounting / IT

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Digital Supply Chain

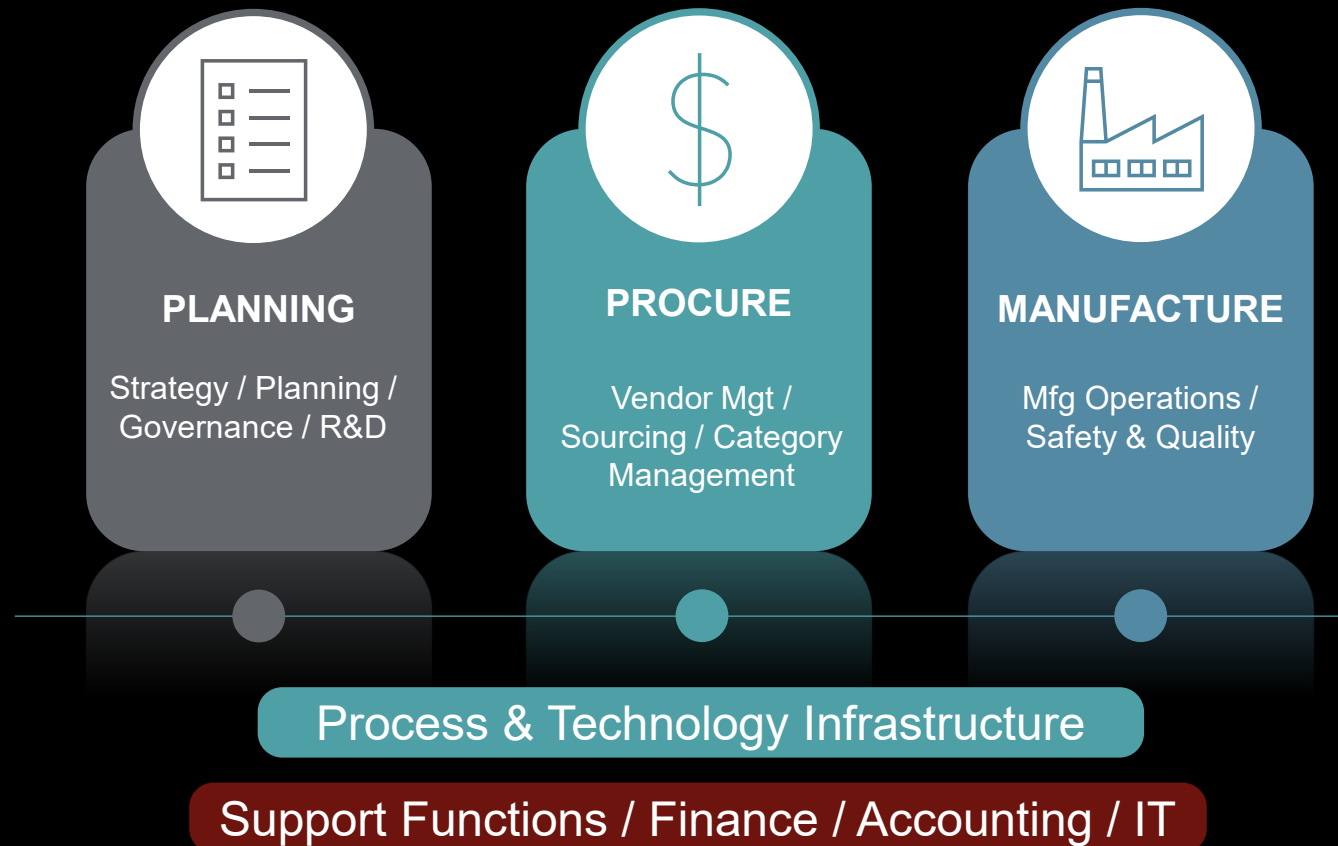
Focus on providing **value** creation for our clients



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Digital Supply Chain

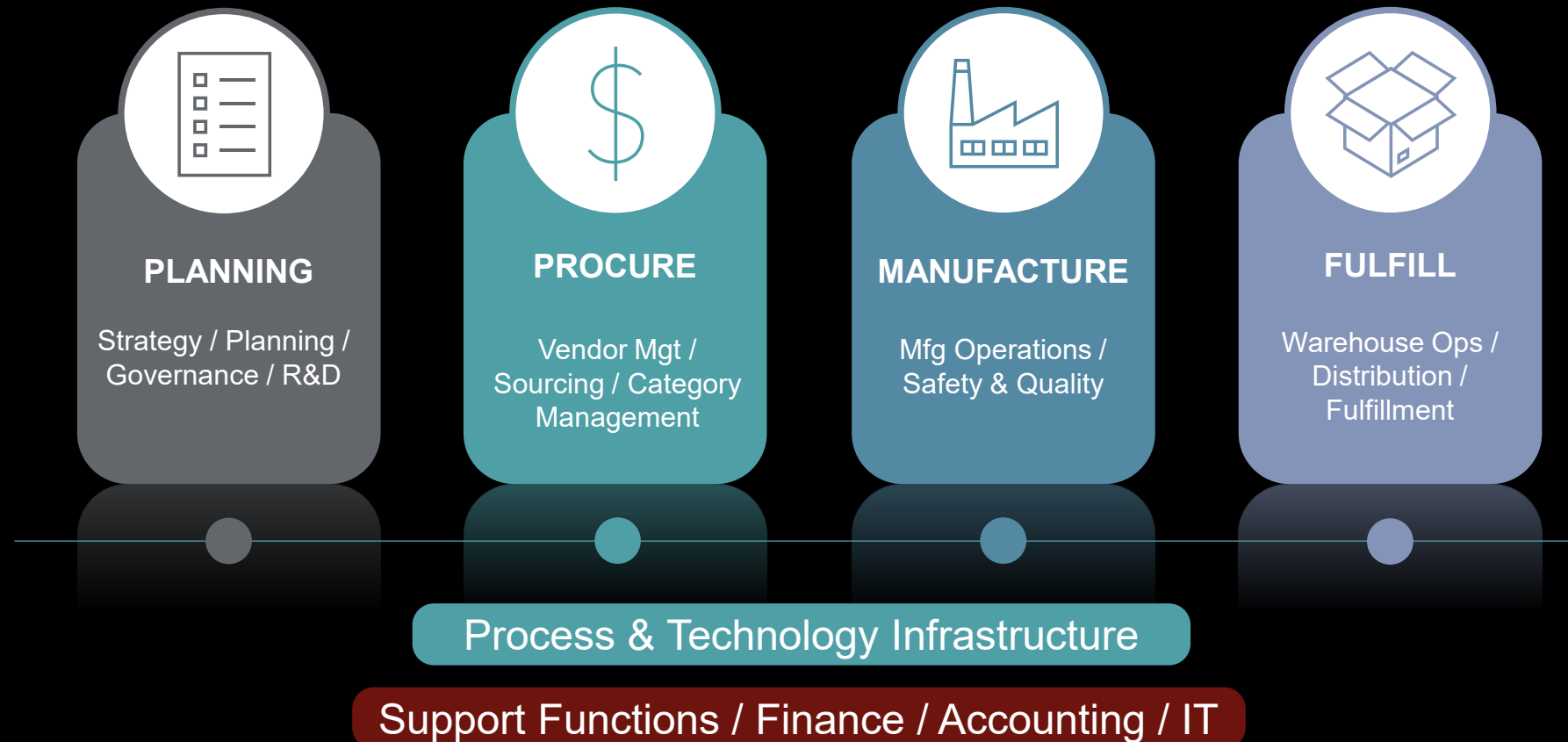
Focus on providing **value** creation for our clients



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Digital Supply Chain

Focus on providing **value** creation for our clients



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Digital Supply Chain

Focus on providing **value** creation for our clients



PLANNING

Strategy / Planning /
Governance / R&D



PROCURE

Vendor Mgt /
Sourcing / Category
Management



MANUFACTURE

Mfg Operations /
Safety & Quality



FULFILL

Warehouse Ops /
Distribution /
Fulfillment



TRANSPORT

Fleet Mgt /
Transportation /
Logistics

Process & Technology Infrastructure

Support Functions / Finance / Accounting / IT

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Industry 1.0

Mechanical Power
Steam Power
Weaving

A top-down view of an industrial assembly line. Several yellow robotic arms are positioned around a central area where car chassis are being assembled. The floor is made of grey metal grates. The scene is brightly lit, and the overall atmosphere is one of a modern, automated manufacturing environment.

Industry 2.0

Assembly Line
Electrical Energy

A photograph of a modern industrial factory floor. In the foreground, a white robotic arm is positioned over a workbench. The background shows various pieces of machinery, conveyor belts, and structural elements of the factory, all slightly out of focus. A large, semi-transparent dark circle is centered over the image, containing white text. The overall color palette is cool, with blues and greys.

Industry 3.0

Automation
Computers
Robotics

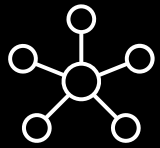
A woman wearing a VR headset is shown in a futuristic industrial setting. She is wearing a colorful, patterned shirt. The background features blurred industrial machinery and a large, semi-transparent circular overlay containing text. The overall scene is bathed in a blue and teal light, suggesting a high-tech environment. The woman's hand is raised, interacting with a virtual interface that displays various data visualizations like bar charts and circular gauges.

Industry 4.0

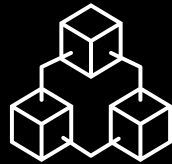
IoT
Cyber Physical Systems
Networks

Industry 4.0

IoT / Blockchain / AI / AR / DT



**Internet of
Things**



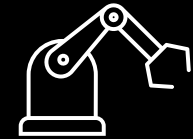
Blockchain



**Artificial
Intelligence**



**Augmented
Reality**



**Digital
Twins**

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Polling

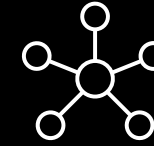
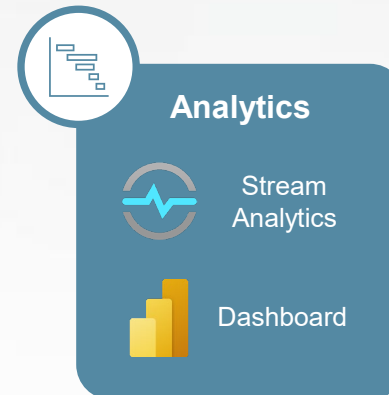
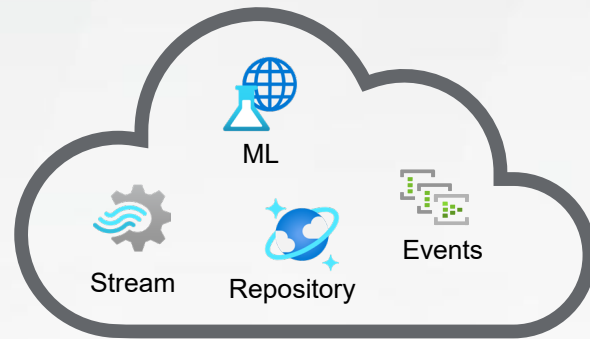
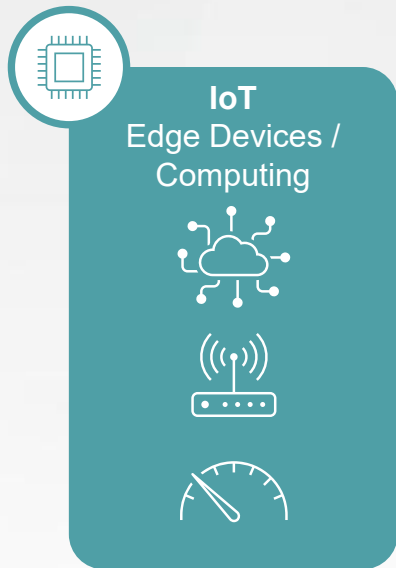
Question 3

Are you feeling secure about Industry 4.0 at your organization?

- Yes, we've started using many of these technologies already
- Yes, we're starting to implement more technology
- No, I think there's work to do
- Unsure

Internet of Things

- Get Real-Time Insights
- Proactive/Predictive Maintenance
- Connected Field Service



The network of physical objects that contain embedded technology to communicate & sense or interact with their internal states or the external environment.

[Definition of Internet Of Things \(iot\) - IT Glossary | Gartner](#)



Mfg



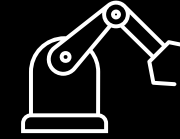
Fulfill



Transport

Digital Twin

- Create “Single Pane of Glass”
- Continuous Monitoring through connected devices using IoT



A digital representation of a real-world entity or system. The implementation of a digital twin is an encapsulated software object or model that mirrors a unique physical object, process, organization, person, or other abstraction. Data from multiple digital twins can be aggregated for a composite view across a number of real-world entities, such as a power plant or a city, & their related processes.

[Definition of Digital Twin - IT Glossary | Gartner](#)



Planning



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Artificial Intelligence

- Demand Forecasting/Planning
- Proactive Monitoring of Machine Health
- Q&A



Vision / Object



Chatbots



Anomaly Detection



AI Builder



The application of advanced analysis & logic-based techniques, including machine learning, to interpret events, support & automate decisions, & take actions.

[Definition of Artificial Intelligence \(AI\) - IT Glossary | Gartner](#)



Planning



Procure



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Automate With AI Builder

Build intelligent experiences in less than an hour (Site Inspection App)



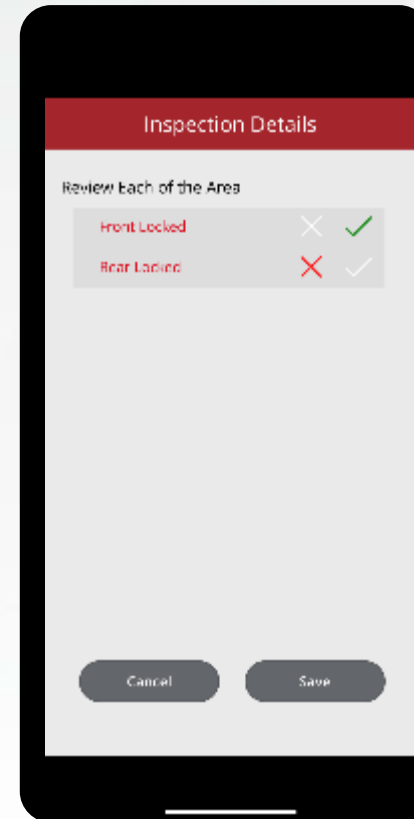
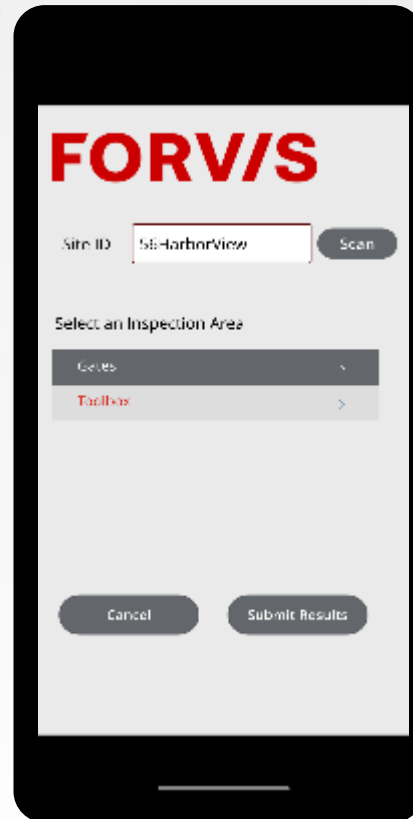
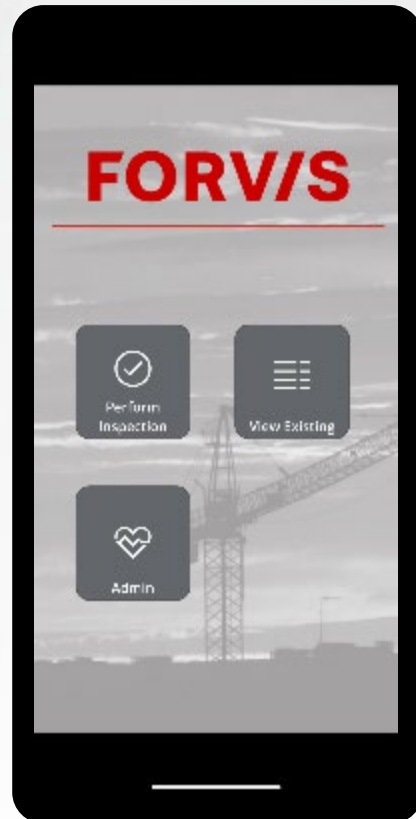
Invoke an AI model with specific workflows, data, & AI Builder



Build an App with PowerApps



Leverage Power Automate for workflows & notifications

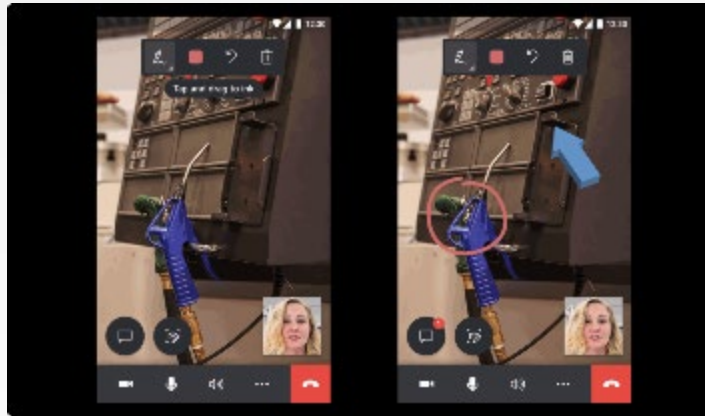


Augmented Reality

- Maintenance of Machinery
- Training/Certifications of Individuals
- Visualize Health of Machine
- Hands-Free/Connected Field Service



Source: [Microsoft HoloLens - Guides](#)



Source: [Microsoft HoloLens – Remote Assist](#)



The real-time use of information in the form of text, graphics, audio, & other virtual enhancements integrated with real-world objects. It is this "real world" element that differentiates AR from virtual reality. AR integrates & adds value to the user's interaction with the real world, versus a simulation.

Definition of Augmented Reality (AR)
- Gartner Information Technology Glossary



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Microsoft

Robotic Picking on Shop Floor

Hy-Tek
INTRALOGISTICS



Source: [Hy-Tek - StorageBoT](#)

Boston Dynamics®



Source: [Atlas | Boston Dynamics](#)

VisionNav
Robotics

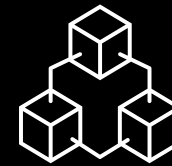
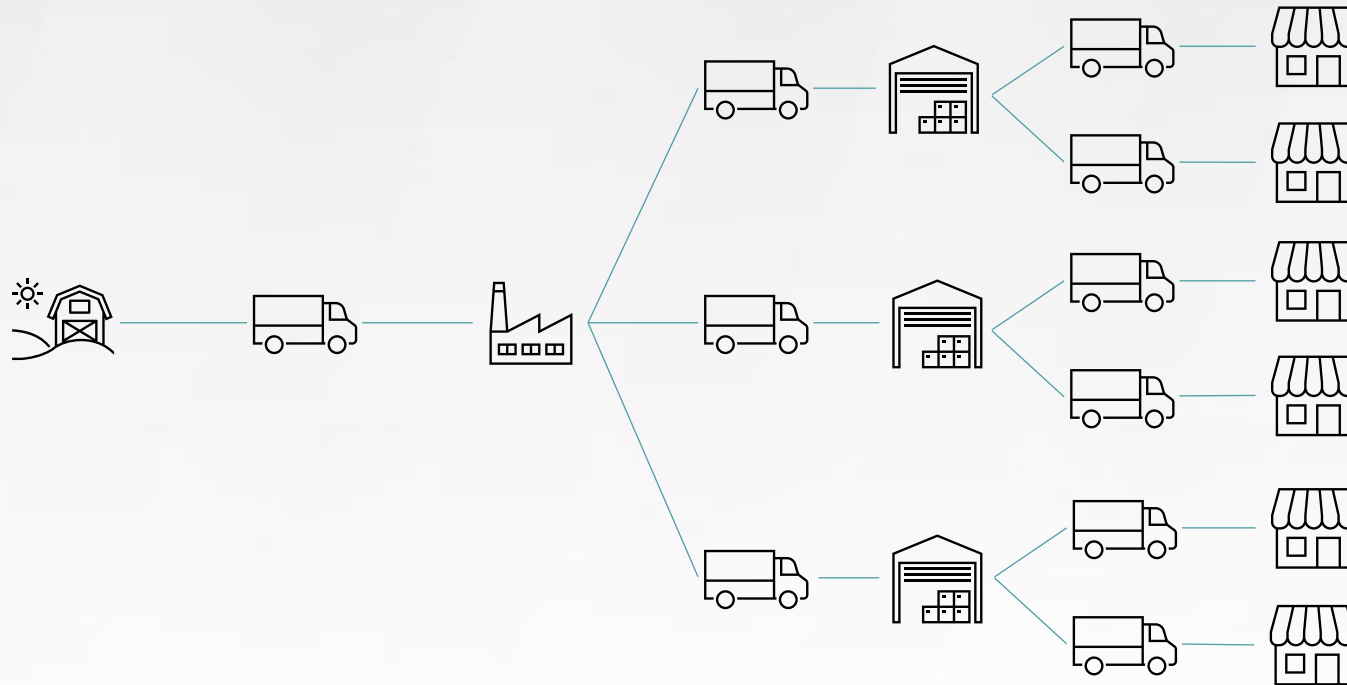


Source: [VNST20 PALLETSTACKERAGV](#)

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Blockchain

- Source to Consumption
- IoT, Temp Sensor, RFID, ASN, Integrations
- Immutable Contracts



An expanding list of cryptographically signed, irrevocable transactional records shared by all participants in a network. Each record contains a time stamp & reference links to previous transactions. With this information, anyone with access rights can trace back a transactional event, at any point in its history, belonging to any participant.

[Definition of Blockchain - Gartner Information Technology Glossary](#)



Procure



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Transport



Future of the Back Office

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Endless Opportunities for Generative AI

Put the power of generative AI to work to improve operational efficiency, innovation, & personalization

Enabling Customer Insights



Enable **customer services teams** & agents to better understand metrics & trends by automatically transcribing calls while identifying speakers, sentiment analysis & suggested summary, notes, & action items

Detecting Fraud



AI-powered **fraud detection** systems can analyze large amounts of data in real-time to identify patterns & anomalies that might indicate fraudulent activity

Automating Financial Reporting



Utilize AI to perform clerical work, like organizing & managing lengthy spreadsheets for **financial reporting**

Recruiting & Onboarding



Analyze data to **predict the needs of new hires** & proactively offer resources, tools, or support even before employees even realize they need them

Generative AI in the Back Office

Microsoft Copilot

Copilot in Word

- Write, edit, summarize, & create content in Word

Copilot in PowerPoint

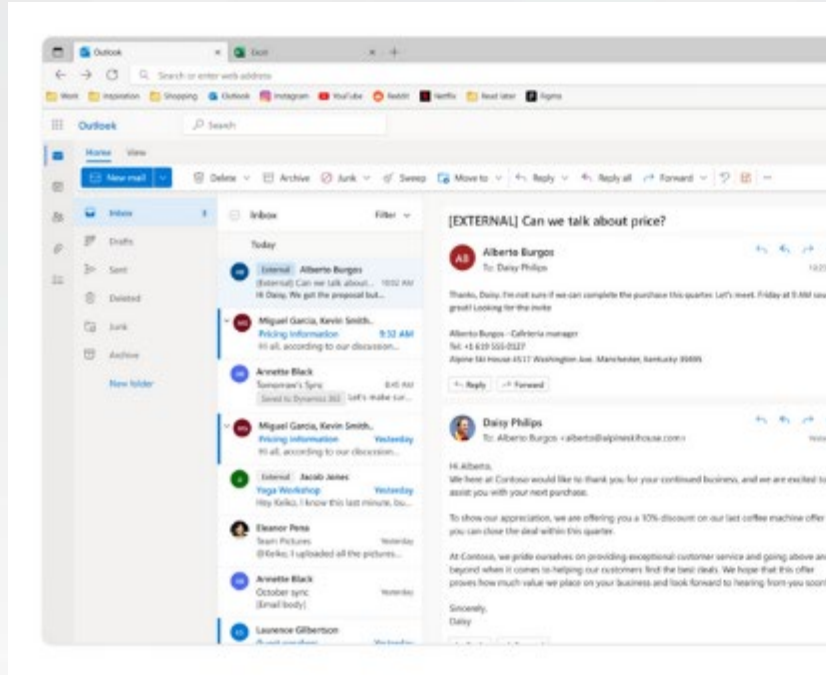
- Transform existing written documents into decks complete with speaker notes & sources

Copilot in Excel

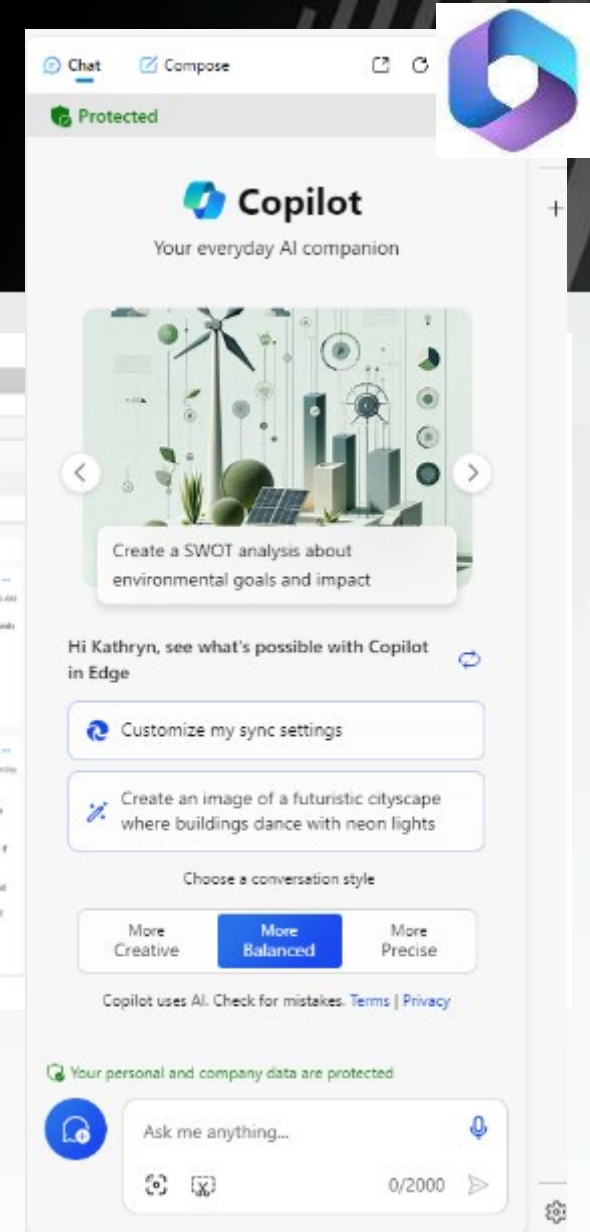
- Query your data set in natural language, not just formulas
- Reveal correlations, propose what-if scenarios, & suggest new formulas based on your questions
- Generate models based on questions
- Identify trends, create visualizations, or ask for recommendations

Copilot in Teams

- Recap conversations, organize key discussion points, & summarize key actions



EDGE Browser



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Risk & Control Considerations

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Controlling Risk

Governance

Senior leadership /
**executive sponsorship &
oversight**

Steering committees with
"ethics czar"

Documented governance
framework

Policies & procedures

Performance measurement

Change Management

Policies & procedures for
change management

Process for developing, testing,
approving, & implementing
changes

Controls for data migration
& conversion

Access controls &
**segregation of
duties**

Data Integrity Data Quality

Appropriateness of data
sources

Data mapping & integration
(including interfaces &
applications)

Data validation checks &
rules

Testing & Monitoring

Pre-implementation
testing

Testing frequency, threshold, &
output

Management evaluation
of testing

Monitoring protocols

Reporting & escalation

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The Horizon Ahead

Charting a course for AI adoption in your organization

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Where Do I Start?

- Define Objectives & Scope:** Understand the problems you wish to solve & what success looks like for your AI implementation
- Assess AI Readiness:** Evaluate your tech infrastructure, data readiness (quality & quantity), & skills & expertise among your team
- Develop a Risk Management Plan:** Identify risks & mitigation strategies
- Choose the Right AI Technologies & Partners:** Look for those that have expertise in manufacturing & an understanding of the business processes
- Pilot a Project:** Start small, evaluate & learn
- Scale & Integrate:** Expand gradually & ensure AI applications are integrated with existing IT infrastructure & business processes
- Monitor, Evaluate, & Iterate:** Continuously monitor the performance of AI implementations against defined objectives; AI is an evolving field
- Legal & Ethical Considerations:** Stay informed, foster transparency in AI decision-making & prioritize accountability for AI outcomes

Adventure Awaits

It's time to embrace AI. It's our role as business leaders in pioneering change.

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Would you like to connect with a FORVIS professional to discuss one of the following topics?

- Use cases for AI in manufacturing
- Getting started with a digital transformation/AI project
- Risks & AI Readiness
- No, thank you; I'm currently in 'do not disturb' mode

Thank You!

Kathryn Schneider, Director
Business Technology Solutions
kathryn.schneider@forvis.com

Ryan Kauzlick, Director
Insights & Automation
ryan.kauzlick@forvis.com

Chris Ricchiuto, Partner
Industry Consulting Leader
chris.ricchiuto@forvis.com

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