

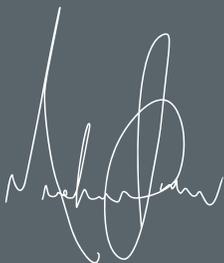
# Future of Manufacturing Part IV

Artificial  
Intelligence

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## Contents

- 1 About Artificial Intelligence
- 2 What the Experts are saying
- 3 The Manufacturer: Advanced Decision Making



**Michael Tucci,**  
CEO and President

## About Artificial Intelligence

We've turned our 'future of manufacturing' email series towards a topic that many know only a little about – Artificial Intelligence.

Instead of focusing on 'blue sky' applications or PR worthy stunts, we want to deeply explore the real possibilities for how Ai and the manufacturing world can come together in the coming decade. With Ai comes many pitfalls, misunderstandings and opportunities. Choosing how to adopt this technology and at what time will play a role in who can leverage it best vs. who writes it off as an R&D spend.

## What the experts are saying

### **Andrew Ng: Inspection**

Andrew Ng, the respected computer scientist and entrepreneur (Founder Coursera, Ai contributor to Google) says: "I've been to so many manufacturing plants. I've yet to walk into one where I did not think AI solutions wouldn't help."

McKinsey published an interesting table in their article Additive manufacturing: A long-term game changer for manufacturers to explain the reality of additive manufacturing across industries.

Ng says the Ai opportunity for manufacturing starts with inspection because all aspects of the manufacturing process require inspection for defects, and the speed and quality of inspection is at the mercy of human operators. Consistency, maintaining standards and speed understandably become an issue, and so turning to Ai may be an answer.

His words above were referenced from a short interview he did with Fortune.

[You can read the interview here](#)

**Intel: Insights**

In Intel's article on the future of Ai in manufacturing, they state: "Artificial intelligence has sparked a new industrial revolution. Manufacturers are looking to their machines for powerful new insights."

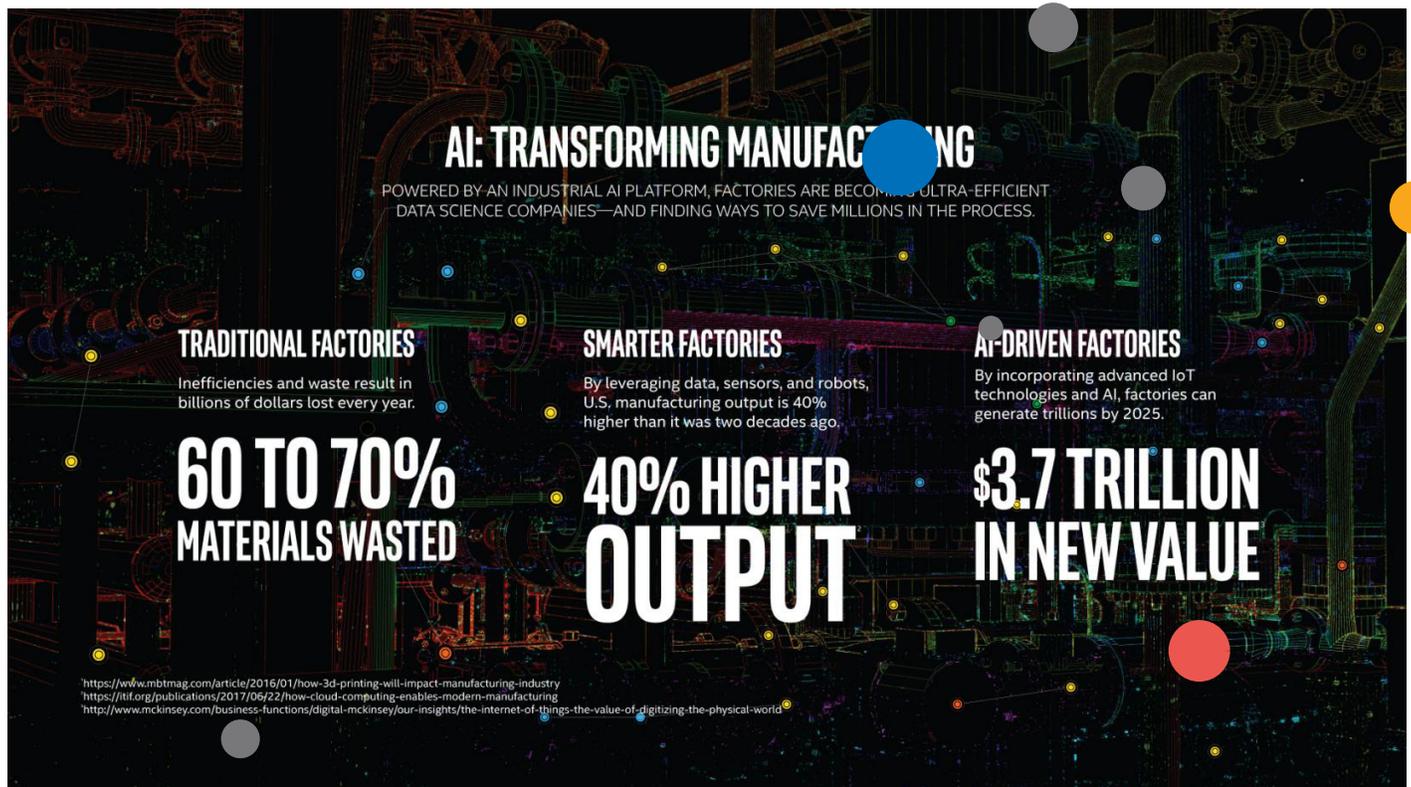
Here we find a core use for Ai in the future. Intel says that 15 billion machines are currently connected to the internet, but that will increase beyond 50 billion in 2020. Already, many manufacturers have sensors in place and those sensors are measuring data – but few have found a way to glean revenue creating insights from the data.

"A steep drop in sensor costs over the past decade has allowed businesses to collect data at every stage of production... By 2025, McKinsey forecasts that "smart factories" will generate as much as \$3.7 trillion in value."

This presents a future data issue because with the mountain of how large the data set available to manufacturers will grow to. These data sets will be large and likely unstructured causing human sorting to be problematic. In fact, sorting through the data and gaining insights will be near on impossible for a human, and certainly not precise – and this is where the power of machines will be felt. Specifically, where unstructured data creates complexity and even man-made algorithms won't be able to cut through, Ai and machine learning will be the tool of choice.

When machine learning is deployed into the enormous data sets that manufacturers contain, it will offer insights we weren't even looking for – and those insights will be usable for manufacturers. Whether it be boosting output, reducing waste, re-designing for efficiency, forecasting machine breakdowns or more effectively maintaining production lines at lower costs.

Alp Kucukelbi, for Fero Labs points out that, "Machine learning allows us to unravel those patterns that would be difficult or impossible for people to identify."



[Read the full article here](#)

## The Manufacturer: Advanced Decision Making

The Manufacturer states that:

"Artificial Intelligence (AI) has the potential to enhance and extend the capabilities of humans, and help businesses achieve more, faster and more efficiently."

They maintain that the advancements in Ai (specifically machine learning) combined with big data and cloud computing will converge to provide unprecedented power to leverage data inside of factories.

The article points out that Ai is already helping OEMs achieve better accuracy, logistics, material forecasting and efficiency, but the future holds more, and most agree.

"The Manufacturer's Annual Manufacturing Report 2018 found that 92% of senior manufacturing executives believe that 'Smart Factory' digital technologies – including Artificial Intelligence – will enable them to increase their productivity levels and empower staff to work smarter."

[If of interest, you can read that report here](#)

To date Ai and smart machines have been used to manage repetitive and non-complex tasks but as the capability of Ai and machine learning continues to improve, it'll become

clear that Ai can adapt to changing tasks more quickly than a human.

"This will be a paradigm shift from assisted intelligence swinging all the way across to full autonomous intelligence where machines are able to learn enough to make recommendations that humans can trust."

Data without insights will render sensors and the internet of things relatively useless for manufacturers, and so Ai will become somewhat of a necessity for them to leverage the power of these other technologies.

"With the right foundations in place manufacturers will see AI make many more informed decisions at each stage in the production process in real time... As AI becomes more mainstream within organisations, a trust and dependability will surface which brings a level of intelligence that becomes mission critical to organisations."

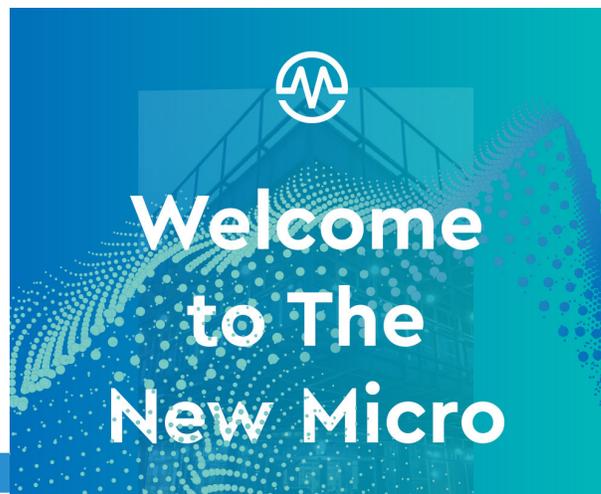
Ai may not be there yet but it's not far away, and the core ingredient for its successful implementation is data. Manufacturers should already be designing and optimizing their factories to deliver data sets that can be analyzed in the future. That historical data paired with real-time analytics will be invaluable when provided to machine learning systems

[The full article from The Manufacturer is here](#)

Ultimately, it may feel blue sky at times but this big picture thinking will likely drive the next decade of planning for many OEMs in preparation for gaining increasingly bigger competitive edges.

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## The thinking robot

"With the help of artificial intelligence, researchers at Siemens have developed a two-armed robot that can manufacture products without having to be programmed. In a glimpse of the future of automated production, the robot's arms autonomously divide tasks and work together as one."

[Read the impressive story here](#)

Automation.com writes in its article on robotics trends,

"With the rapidly increasing power of the microprocessor and artificial intelligence techniques, robots have dramatically increased their potential as flexible automation tools. The new surge of robotics is in applications demanding advanced intelligence."

This thinking robot is converging with complementary technologies to enhance machine vision, touch, speech recognition and advanced mechanics. Combined with a brain, the ability for robotics to integrate with the manufacturing process and provide real insight and value is on the horizon.

[Read the whole article here.](#)



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Every innovated solution is backed by the uncompromising pursuit of excellence at every phase of our manufacturing process.

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