

## A Virtual Think Tank Executive Summary

# Setting Expectations for Intelligent Automation



The Manufacturing Leadership Council recently invited select thought leaders from different industries to discuss the acceleration of intelligent automation, the use of machines that understand their environments and interact with humans and other machines. Participants discussed the effect this digital transformation will have on manufacturers, examining new technologies as well as organizational challenges and key opportunities for implementation.

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### MODERATOR

#### Jeff Moad

Research Director  
Manufacturing Leadership Council

### THOUGHT LEADERS

#### Todd Boppell

Chief Operating Officer  
National Association  
of Manufacturers

#### Kristi Carter

Plant Manager  
3M

#### Tor Chamberlain

Vice President Quality Systems  
and NPD Operations  
The AZEK Company

#### David Meek

Partner, Digital Operations  
Center of Competency – Internet  
of Things  
IBM

## Introduction

Manufacturing Leadership Council Research Director Jeff Moad recently hosted a Virtual Think Tank discussion on a topic that will soon have a far-reaching effect on manufacturing companies large and small – Intelligent Automation. Simply defined, Intelligent Automation (IA) is the ability to collect and synthesize vast amounts of data from manufacturing plant machines, equipment, and systems and convert it into useful information that can be processed to recommend specific actions. It can be used to track and automate processes and workflows as well. Ultimately, because it is “intelligent,” IA can learn as it goes and even make decisions. Applications of IA include robotics, autonomous cars and cognitive computing.

The upcoming influence of IA on manufacturing cannot be overstated. Alongside the Internet of Things and Machine to Machine capabilities, the advent of IA heralds a new era of manufacturing underpinned by automation and connected devices and machines. In some cases this will supplement human labor; in others, it will replace it. In almost all cases, it will require new and evolving skill sets from the engineers, operators and other workers on the factory floor.

## Intelligent Automation: Opportunities and Obstacles

The purpose of this Virtual Think Tank was to identify and discuss where technologies and automation might be most productively applied in manufacturing operations today. The panelists represented a mix of industries and perspectives, all seeking the latest insights about automation as well as common challenges and benefits involved in implementation. Here we present key findings and answers to the questions Moad posed below:

### ***How can intelligent automation help you to positively impact operational efficiency?***

As one panelist stated, making their product involved many variables, so having access to data that IA provides about materials and equipment variances could mean a huge improvement in quality and output. As stated, IA could potentially help them “find problems before problems find them.” David Meek, *Partner, Digital Operations Center of Competency, Internet of Things*, IBM, concurred, stating, “Machine learning and deep learning can now be used to optimize the manufacturing process and predict performance based on the data.”

### ***Key Insights:***

- IA can enable better processes by allowing manufacturers to gather and act on relevant data in real time
- IA can be instrumental in helping to identify and adjust for problems, inconsistencies, variations in material quality, etc.
- IA can help manufacturers identify problems before they occur – potentially huge savings in time, money and resources
- Machine learning can help to optimize the manufacturing process and to predict performance



### **How can intelligent automation help to reduce financial risk and/or lead to financial benefits?**

Although implementation costs and addressing human resistance to new technologies (i.e. fear of job loss) can be a real challenge, the likely bottom line benefit of intelligent automation solutions was noted by the group. The obvious advantages of leveraging IA to catch product defects as well as human errors earlier, and the capabilities of smart technology to take product quality and manufacturing operations to the next level were discussed.

Creating a partnership between humans and machines was examined. As one participant explained, Artificial Intelligence (AI) can be used as an advisor of sorts, empowering workers on the floor by feeding and supplying data about equipment, sensors, potential problems and more. This can be done via text messaging, for example.

#### **Key Insights:**

- Intelligent Automation can potentially improve quality, reduce returns, reduce scrap, all contributing to a better bottom line
  - ◆ An example of this is BMW's use of IBM's visual analytics technology. It allows them to examine one product layer at a time; much more efficient
  - ◆ Another example: IBM clients use machine learning for acoustic insights, listening to washing machines engine sounds and troubleshooting
- Detecting problems earlier can often lower overall costs
- Human error (and costs, fines, loss of labor) can be lowered through the use of IA technology
- IA can help companies to fully and efficiently harness large amounts of data for improved product design and operations
- Man + Machine = AI. AI can be the advisor to humans, empowering employees with information and data via texts to improve processes and prevent errors or mishaps



“ Machine learning and deep learning can now be used to optimize the manufacturing process and predict performance based on the data. ”

– **David Meek**  
Partner, Digital Operations  
Center of Competency,  
Internet of Things  
IBM

“ Currently, IA is most applicable for repeatable tasks. We program in data or use machine learning to improve material variability and focus on visual defects. ”

– **Kristi Carter**  
Plant Manager  
3M

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“Often simple materials can cause issues. You can avoid potential negative outcomes and lower scrap numbers by intelligent use of technologies.”

– **Tor Chamberlain**  
Vice President, Quality Systems and NPD Operations  
The AZEK Company

“IA can positively affect operational efficiency by helping to determine root causes of variability and improving quality and throughput issues.”

– **Jeff Moad**  
Research Director  
Manufacturing Leadership Council

### **How can operators on the floor interact more seamlessly with intelligent machines?**

Technology capabilities today go well beyond just collecting information. Now data can be easily shared and presented to workers to aid them in doing their jobs. This is happening on the factory floor as well as out in the field. Augmented reality, videos and cognitive equipment advisors are just a few examples of ways technology and intelligent machines are changing manufacturing and repair capabilities across industries.

Artificial Intelligence can also help to improve worker safety. Importantly, it can be leveraged to help reduce accidents and keep workers safe, thus also reducing costly safety violation fines and penalties.

Education is another way manufacturers can facilitate more seamless worker interaction with new intelligent machines. The reality is that manufacturing workers' skill sets and competencies must change with the times. There is a real need to (re) train and educate workers to stay current. As their jobs evolve, they need to be open to new training and education.

An aging workforce and current unfilled manufacturing jobs was another issue addressed by the group. One panelist shared that he believes the younger workforce is more adaptable to change, and that this is a good thing as technology will continue to affect manufacturing processes and procedures, and workers will need an open mindset and evolving skill set.

#### **Key Insights:**

- Manufacturing workers will need to move from a “collecting data” approach to a collaborative, man + machine approach to leverage data and technology more efficiently
  - ◆ For example, IBM’s client DHL uses Google Glass and Augmented Reality (AR) to improve worker performance and help the supply chain
- The U.S. Army uses cognitive equipment advisor to help maintain and fix vehicles in the field; instructions and videos can guide repairs
- Some organizations are already implementing AR for communications between operators and machines
- Smart companies will leverage technology to improve safety on the factory floor, via sensor warnings, etc. thus lowering safety violation fines as well as human injuries



### **What are some significant opportunities with intelligent automation?**

IA presents an opportunity to help overcome the workforce's lack of skills and training gaps. The potential for significant productivity and quality improvements and a positive effect on the bottom line are other important IA opportunities. These were discussed throughout the Virtual Think Tank.

#### **Key Insights:**

- Educate current workers about Intelligent Automation; train current employees on new technologies
- Currently, there are many open manufacturing jobs and experienced workers are retiring; intelligent automation capabilities can help to fill this gap
- Capitalize on greater productivity gains by removing human element where appropriate

### **What are some of the challenges to implementing IA technology going forward?**

As referenced above, one of the key challenges to implementing IA today is finding a workforce with the appropriate skill set to do so. Additionally, workers must possess the desire and ability to upgrade their current skill set to meet new job descriptions. Finding skilled maintenance workers is a real problem.

Additionally, small and medium sized businesses (comprising approximately 95% of manufacturing companies) often lack the money and resources to easily implement IA and other technologies, and to enter the new automation ecosystem.

The Manufacturing Leadership Council was mentioned as a resource to educate and update these smaller companies about the realities of M4.0 as well as other emerging manufacturing practices and important trends.

Another very real obstacle to IA implementation is worker resistance. Rightly or wrongly, many see AI and other emerging technologies as an enemy to job security. They may be resistant to learning about new technologies and adapting new procedures and it can be a struggle for organizations to get their buy-in.

#### **Key Insights:**

- Many small and medium sized companies lack the money and/or resources to enter the emerging intelligent automation ecosystem; it is difficult for them to fund new technology initiatives
- Worker resistance can also contribute to implementation issues; getting buy-in from workers for new digital ecosystems can be an obstacle to moving forward
- Many companies use a proof of concept approach, probably better to do a small pilot program instead
- Don't just 'play' with new technology, focus on real business problems and embrace the technology to solve them



“ Augmented reality is the new secret sauce between operators and machines... humans are more valuable interacting with machines or devices on the factory floor. There are big opportunities there. ”

**– Todd Boppell**  
Chief Operating Officer  
National Association  
of Manufacturers

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### ***What are some important next steps for manufacturers?***

With his closing question, Moad asked the panelists what realistic next steps they might employ on their journey to intelligent automation. It was recommended that participants tie technologies like intelligent automation back to their organizational strategy. Panelists were encouraged to transition from exploring technologies to applying them intelligently and to look for meaningful pilot projects that could lead to significant bottom line cost savings. Many liked the idea of a pilot and bringing external expertise in. They believed that a well-thought out pilot could have a huge impact.

Todd Boppell, *Chief Operating Officer*, National Association of Manufacturers, shared that he often observed that small and medium sized companies truly struggle with pilots and implementing new technologies. He noted that these smaller organizations often do not try new technologies until they realize it's something they absolutely must do to “stay in the game,” or compete. He indicated that he had seen a mixed bag of results when they do begin to experiment with and apply new technologies.

As a final thought, participants were reminded that it takes a fairly large ecosystem of technology partners (platform providers, vendors, sensor manufacturers, and others) providing three to six different technologies to succeed in employing intelligent automation. Not a simple formula, but necessary for manufacturers to remain competitive today.

“Today, smart solutions require an ecosystem of partners... often including three to six different technologies.”

– **David Meek**  
*Partner, Digital Operations  
Center of Competency  
Internet of Things  
IBM*

**Patricia Jacoby**  
*Publications Editor, Events  
Frost & Sullivan*