



INVEST to SURVIVE

Manufacturers and the Technology Choice

By **Crickett Gibbons**

Industry 4.0. The 4th Industrial Revolution. Industrial Internet of Things. Smart Manufacturing. Labels and names may vary, but the implications are the same. The future of manufacturing will be powered by innovation – and the future is here.

Manufacturers that haven't yet adopted smart technology are not alone. While more than half of the participants in a 2018 Sikich manufacturing and distribution survey reported at least monitoring developments related to the Internet of Things (IoT), fewer than 10% currently use IoT technologies. Further, 30% have no clear understanding of IoT.

More report deploying robotics, but almost 40% of manufacturers and distributors are not using robotics in any operations.

We talked with a researcher, manufacturer, consultant and technology professionals to learn more about the state of innovation in Indiana manufacturing, initiatives that bring research and industry together, and what to expect now and in the future.

IoT applications

While planning and developing the Indiana IoT Lab in Fishers, which provides space and support for Indiana companies to explore IoT technology, founder and CEO John Wechsler reports he met with between three and four dozen manufacturers around the state.

"We've definitely seen some common themes. We've seen some

outlying items, but a couple of the recurring themes are automation and technology and innovation on the plant floor, extended through the supply chain and even embedded into the product. That's a done deal. It's going to happen," he stresses. "We can ignore it, but we do so at our own peril."

John Kleb, partner of strategic technologies at Sikich, splits the manufacturing IoT landscape into two main areas.

"The first is IoT on your shop floor to provide you with information for preventive maintenance or just-in-time inventory location and regular information about how long the machine runs and how many pieces it produces, etc. ... The other side, though, is putting IoT in devices that you create and sell. ... That elevates customer service and creates a differentiation between them and the other manufacturers."

The second part is what manufacturers often forget or have not been able to advance, he contends.

Incorporating IoT can increase operational efficiency and reduce costs within manufacturing processes, but when used in products it can help differentiate a company, elevate customer service and increase customer engagement, Kleb summarizes.

For some, he adds, IoT in their actual products may not make sense, but it could help in distribution. "Embedding IoT devices in goods you're shipping helps you track the state of the goods from when they leave your dock to wherever you are giving up ownership or taking on ownership. That's the third level."

The ideal scenario will vary by manufacturer and product – from

mass customization to smart products and services – but all industries likely will aspire to have responsive and resilient supply chains, comments Jason Toschlog. He is chief innovation officer at Flexware Innovation, a manufacturing-focused technology integration company headquartered in Fishers with an office in Valparaiso.

Toschlog says that companies that have identified their pain and are trying to solve real problems with these newer technologies are being more successful than those that are dabbling. “They are trying to target real solutions that can gain them business value.

“Most of the people we are working with, they are just on the very early stages of this,” he shares. “If I were to summarize what I’m seeing in 2018, it’s that most of our clients I would consider in a proof of concept, a pilot stage, with these technologies. They are trying to understand them a little bit better. ... I would say what’s been true for the last couple of years is that people are in this testing and trying mode and trying to develop what their internal strategy is for this Industry 4.0 world.”

Certain types of manufacturers also tend to be a bit farther along. “Some of the industries where they are making products that have to communicate, so their product is part of the Internet of Things, seem to be further ahead,” he adds. “They’ve had groups internally thinking about this whole remote monitoring of devices for a very long time. So they tend to get it much more quickly.” Examples would be large engine manufacturers like Cummins, Caterpillar and Rolls-Royce.

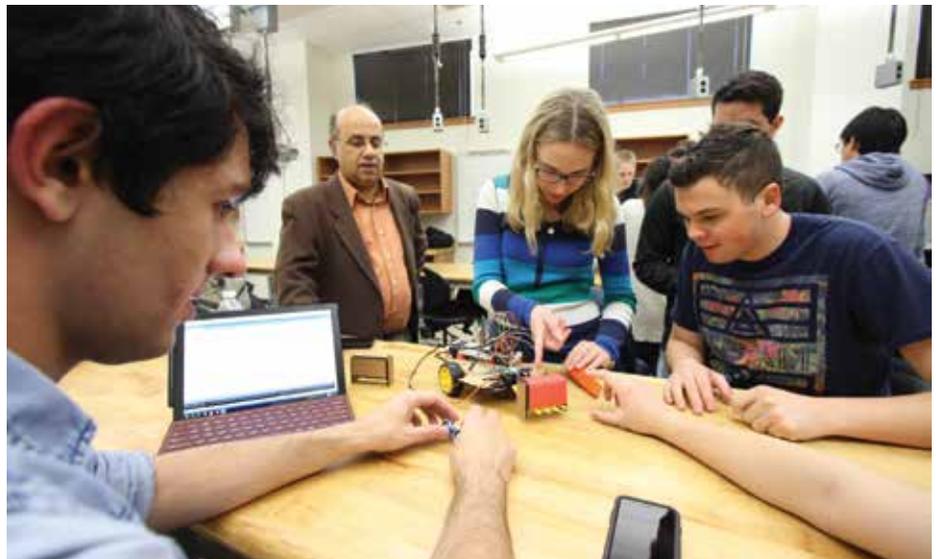
Testing new technologies

To remain competitive in the global economy, Kirby Risk is partnering with Purdue University researchers and others on a project at its Service Center in Lafayette. The 224,000-square-foot facility makes wiring harnesses and control panels among other products.

The aim is to further boost productivity through additional automation, perhaps including a robot or other new application in a production cell. The goal is not to eliminate human workers, president Doug Mansfield stresses, “but to assist the human so we can get more output in the same amount of time.”

Mansfield points out that as a Tier 1 supplier to original equipment manufacturers in a global market, “We have to be very, very competitive. ... So anything I can do to automate processes, to increase that productivity and reduce costs, is always on the radar for us.”

This use case study is one early step in a much larger project involving Purdue, Indiana University and Massachusetts Institute of



Purdue University students build warehouse robots with mechanical engineering professor Karthik Ramani in a National Science Foundation-sponsored class. The class, part of a large research project addressing the future of manufacturing technologies, includes training the next generation of workers in new skills in different ways.



Technology researchers that is funded by a grant from the National Science Foundation’s (NSF) “Future of Work at the Human-Technology Frontier” program. The goal is to develop new technologies that will allow manufacturers to realistically simulate interactions among workers, robots and machines.

A simulation platform will use augmented reality to superimpose images over real objects or environments such as factories, warehouses or a specific workflow. The aim is for workers to be able to easily instruct robots to perform various tasks, with IoT enabling wireless communication and collaboration. The overall project will include a workforce training component and strives to complement labor, not replace it, while providing future workers with new skills.

Purdue Professor of Mechanical Engineering Karthik Ramani is leading the research. He

explains that testing technology solutions in advance by simulating a workflow or whole factory with workers and robots may be especially appealing for small- and mid-sized manufacturers. “Before companies make the change and do all this investment and so on, we can play it out. And then we can take the risk out for them.”

Incorporating a simulation platform with augmented reality also shortens the development timeframe. “We can figure it out not in 10 years. We can figure it out in a short time, in five or six months.”

Ramani is visiting companies and partnering with a few, like Kirby Risk, on small use cases while the team continues to develop the simulation platform and test user-friendly mobile robots that can be easily programmed. Figuring it out in a scalable manner is the challenge, he admits. More



The Indiana IoT Lab in Fishers provides space, equipment and other amenities to support small tech companies and entrepreneurs looking to develop innovative ideas about internet-connected devices. The lab also helps manufacturing, distribution, agriculture, logistics and other companies have a platform to connect with technologies that could make a business impact.

information will be available for a workshop in October 2019 funded by NSF.

Mansfield foresees that future projects at Kirby Risk will follow this first test case. “We think it can expand to a much larger degree, but we thought we should walk before we run.”

Making sense of data

Kirby Risk also is involved in the Wabash Heartland Innovation Network (WHIN), which is collaborating with Purdue and Ivy Tech Community College on using sensors and IoT in manufacturing and agriculture in a 10-county area.

“Many companies, particularly small companies, have lots of information that they get off their equipment and their processes throughout the plant,” Mansfield observes. “So how do you take that and connect it all together to give your team leaders, your supervisors, your managers real-time information displayed in a proper way that won’t inundate them with data, but give them information to make decisions about product flow through your plant instantaneously or live?”

That’s one challenge he hopes WHIN can help address for companies.

Toschlog supports the idea that data collection and analysis is a growth opportunity. “We are seeing people collect a bunch of data that’s not very valuable at all, or they’re collecting what we consider is the wrong data. So I think, as a whole, the industry is going to have to become better and more knowledgeable at discerning what is good data.”

Differentiating hype from reality is important, Toschlog warns. “The machine learning and artificial intelligence part of all of this, those are incredible tools and there are some really neat techniques that can create a lot of value, but they seem to be the things people are most confused about.

People’s expectations of what you could do with that technology are vastly different than what it can do in some cases.”

Filling the gaps

Working with Ramani’s team provides access to the latest technology and helps fill the gap for smaller companies that don’t have the information technology resources to figure out the programming and maintenance of the robots or other solutions, Mansfield points out.

“Most small manufacturers don’t have the staff to do the research and analysis on what technology is applicable today,” he contends. “They are our eyes and ears for the current, latest technology that will improve our processes the best. They give us that opportunity and exposure that we wouldn’t get if we had to do it on our own.”

Collaborations like this help overcome a

main obstacle to implementing IoT: lack of employee skills and knowledge.

Legacy hardware, along with software and other traditional platforms, that may not support new requirements are among other potential obstacles, Toschlog asserts. However, older machinery can at times be retrofitted to take advantage of IoT, Kleb offers. And many enterprise resource planning systems are able to receive information from sensors installed in equipment.

Looking ahead

While manufacturers consider possible IoT and robotics applications, additional technology trends are worth noting for future development.

Kleb is excited about Microsoft HoloLens and augmented reality. In a manufacturing environment, for example, HoloLens could extend a technician’s range, allowing a



By testing and investing in smart technology, manufacturers like Kirby Risk can remain competitive. The company is working on an initial project to integrate a robot into a manufacturing cell.



customer or less-trained worker to fix or complete maintenance on equipment under the direction of a technician at a remote location. Trained technicians can see what a field agent or customer wearing the HoloLens is seeing, and the person in the field can see what the technician marks or writes on the view.

“It’s out there now. It’s real and it’s taking off,” he emphasizes.

Kleb also anticipates manufacturers will be involved in blockchain technology. “It’s probably the most disruptive technology of this century, like the internet was last century,” he muses, admitting, “but we don’t know that for sure.”

Manufacturers would be involved at the beginning, asked – or forced – by distribution or sales points to put IoT devices on their products to provide data into the blockchain, an immutable record of information on a distributed network.

Toschlog believes blockchain “has numerous fundamental flaws for really high-speed transactions that would happen at a manufacturing level ... but I do think it will evolve. It will be a critical technology, both for commerce and for contracts.”

Lead or be left behind

Central to the discussion is the need for Indiana to take advantage of the opportunities presented by smart technology in manufacturing.

“We should be one of the leaders globally in this, given our manufacturing capability and our experience,” Wechsler stresses. “If we can infuse IoT thinking, if we can infuse design thinking, innovation and entrepreneurial thinking into the manufacturing capacity we have here in the state, it reasons we should be the leaders.”

The IoT Lab, in conjunction with the state, is releasing a report, “The State of IoT,” that will be available on the IoT Lab web site. It will showcase connected technology use, development and initiatives in Indiana, spotlighting core areas including manufacturing.

“It goes even beyond staying competitive and being more efficient. Some of this is going to boil down to straight up survival,” Wechsler cautions. “My fear is that too many in Indiana are going to brush it off as something that’s not going to impact them. ... I can’t think of an industry where technology – and specifically IoT – is not going to radically transform what’s going on today.”

RESOURCES: John Kleb, Sikich, at www.sikich.com | Doug Mansfield, Kirby Risk, at www.kirbyrisk.com | Karthik Ramani, School of Mechanical Engineering at Purdue University, at engineering.purdue.edu | Jason Toschlog, Flexware Innovation, at www.flexwareinnovation.com | John Wechsler, Indiana IoT Lab, at www.indianaiot.com

INNOVATION AND INDIANA’S BUSINESS FUTURE

LOCAL GOVERNMENT

In recent years, Indiana has been recognized for efforts in innovation due to the state’s strong business climate. Oftentimes, larger cities win credit for these efforts, but as the mayor of a thriving rural community in southern Indiana, I am honored to share about innovation in our small but vibrant area. I believe that small-town culture combined with industry leaders committed to innovation and the community culture drive us forward.



Denny Spinner

To ensure economic advancement and stability, Huntingburg – and communities like ours – strive to attract business and provide a reliable workforce. This takes true commitment from both the private and public sector. Industry leaders must give back to employees and community alike in order to create a culture that fosters good business and attracts potential employees. Likewise, the community must forge new amenities and culture to bring people into the town and provide the workforce that enables industry to grow.

The business leaders in Huntingburg have truly invested in innovation and this community. For example, our two largest employers, Farbest Foods and OFS, have continually focused on innovation and have generously provided for our community.

Farbest is implementing new technology across all functional areas of its business, resulting in a \$21 million investment in its Huntingburg turkey processing facility. Ted Seger, president of Farbest, says that projects such as these lead to improvements in labor costs, yields and what he calls the “Happy Index” for employees as their jobs are made significantly better.

When asked why it continues to reinvest and innovate, OFS Chief Executive Officer Hank Menke tells me that first and foremost the company must take care of its people, energize them and give them the lifestyle that they want to have. The second thing is that they want to instill the same culture that exists at OFS within the community.

This is what is happening in Huntingburg. The innovative spirit of our corporate leadership is spreading into the broader community, creating a true entrepreneurial spirit.

I am so proud to lead and be a part of this vibrant community and hope that this type of drive and commitment to community will continue in other towns and cities across Indiana and the United States.

AUTHOR: Denny Spinner began his service as mayor of Huntingburg in 2011. Learn more at www.huntingburg-in.gov