Chief Executive

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THE ROAD AHEAD
FOR U.S. BUSINESS

ARE YOU READY FOR THE INTERNET OF THINGS?

What CEOs need to know to compete in the next great wave of value creation in manufacturing.
By Jennifer Pellet

UNLESS YOU'VE BEEN LIVING UNDER A ROCK, you've probably heard quite a bit about the Internet of Things (IoT). The buzz around employing advances in embedded sensors, processing, data analytics and wireless connectivity to enable the type of machine-to-machine communication that can revolutionize businesses has definitively become a roar. For manufacturers, the implications are huge. McKinsey estimates the IoT could unleash as much as $2.3 trillion in new economic value worldwide by the year 2025.

In fact, the IoT topped Garner's Hype Cycle for Emerging Technologies last year, bumping Big Data off the peak. To some, this might sound like a potentially dubious distinction, given the somewhat negative connotations of the word "hype." However, what occupying the pinnacle of Gartner's Hype Cycle actually indicates is that the market has enormous expectations for an emerging technology. In making it to the peak, the IoT joins a venerable list of technologies with game-changing potential, including 3D printing, gamification, wearable user interfaces and cloud computing. In other words, expectations may be inflated, but the potential is undeniable.

Yet the excitement around the IoT's capabilities is also a source of anxiety for business leaders, who face the challenge of getting their arms around yet another emerging technology. For value creation to happen on the scale predicted by McKinsey, manufacturers must be ready to collect, analyze and capitalize on vast streams of data from customers, suppliers and even products themselves, all arriving at increasing volumes and speed.

Further complicating that formidable task is the fact that the term itself has yet to be clearly defined, agreed participants at a recent *Chief Executive* roundtable held in partnership with Microsoft. "The hype on IoT is actually pretty

🔑 Key Takeaways

1

Size Matters
The IoT could generate $2.3 trillion in value by 2025

2

Beyond the Hype
View IoT as an evolution rather than revolution

3

Data Overload
Break adoption down into manageable steps

deafening," noted Barb Edson, general manager, marketing, for Microsoft Cloud & Enterprise. "Yet, the reality is that there is not even a common definition for it."

However, Edson went on to urge CEO participants not to let the murkiness surrounding IoT—the cloud around cloud-enabled technology—to sour them on pursuing the business opportunities it represents. "Many people are scared of IoT from a business standpoint, and they really shouldn't be," she explained. "It's not about ripping out and replacing existing systems. It's about looking at which business processes you can really impact. Start small and you can have a big impact."

IoT can be viewed as an evolution rather than a revolution, building on the infrastructure companies already have in place, she added, pointing out that most companies today are already gathering massive amounts of data on myriad devices. More of a concept than any one specific technology, IoT involves leveraging connectivity to efficiently collect and analyze that data

to make more informed business decisions, identify opportunities and predict customer behavior more effectively. That can be as simple as a trucking company's effort to automate maintenance of its vehicles (see sidebar: "M.G. Bryan: Curbing Breakdowns") or as complex as an enterprise-wide endeavor

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or to collect, integrate and organize sensor data from remote equipment across global supply chains.

Delving Into Data

Those struggling to fully leverage connectivity should take solace in the fact that they are not alone. Most companies are early on the IoT learning curve. Several CEO roundtable participants expressed frustration about being unable to make effective use of the huge amounts of data flowing into their companies. "The ability to install sensors and get millions and billions of bits of

information is pretty straightforward," noted Bob Nardelli, CEO of XLR-8. "The challenge that some of the smaller companies, and maybe even some of the bigger ones, are having is when you get to the data analytics. There's the question, 'Okay, I've got all these sensors. We're recording all this data. We're on this thing called the Cloud. Now what do I do with it all?'"

"In our case, we have information, but we're not using it to such an extent that it's preventive," agreed Erik Fyrwald, CEO of Univar. "It allows us to look back historically and say, 'Oh, now we know why that happened,' but we're not at the point where we can make sure something won't happen again."

Even companies like Federal Express, which is viewed as a forerunner in real-time data collection and analytics, are struggling to take IoT's capabilities to the next level. The company has made great strides in forecasting accuracy since equipping drivers with handheld devices and compiling information on efficiency and customer dynamics in real-time.

"Now we're trying to link all of that together to be more predictive in

Curbing Breakdowns

FOR HEAVY EQUIPMENT MANUFACTURER M.G. Bryan, operating oil and gas fracturing vehicles, each of which typically costs more than $1 million, in remote, extreme environments (think no cell phone reception) has long been a challenge. The vehicles require a good deal of TLC, including oil filter replacements every 200 to 400

hours and complete engine rebuilds after 7,000 hours of service, sometimes sooner. Mismanaged maintenance can be costly—downtime on a vehicle has a price tag of between $3,000 and $7,000 per day, not including lost product revenues.

Leveraging the power of the IoT to develop a scalable solution for remote asset management of its fracturing vehicles came as a real boon for the company, which can

now access and analyze in-field service information. Using mobile technology, the cloud-based system gathers control-system data to produce reports and dashboards on the condition of an individual vehicle's drive train and fracking performance, as well as process performance and maintenance trends related to entire fleets.

Data is broken down into incredibly small packets so

that information can be sent even in areas with poor cellular coverage. Or—in cases where a connection can't be found—stored in a gateway and sent once a connection is regained.

In addition to improving up-time and productivity for M.G. Bryan customers, the system has the potential to collect data that will demonstrate the vehicles' competitive performance to customers.

> ## "You generate a lot of data in IoT. It needs to be processed in layers."
> ### –SUJEET CHAND
> ### ROCKWELL AUTOMATION

ABOVE: Univar's Erik Fyrwald, Rockwell's Sujeet Chand, XLR-8's Bob Nardelli

nature," Cary Pappas of FedEx Tech-Connect told participants. "The question is, how do you take forecasting and make it a more exact science by overlapping better information, and how do you then boil that down to the things that are most crucial to your business? In other words, how do you simplify that [data] so it's usable to the people who run our operations? We've got a ways to go before we get to where we want to be."

While the sheer amount of data being generated and the possibilities that data represents can be daunting, the process can be broken down into more manageable steps, pointed out Sujeet Chand of Rockwell. "You generate a lot of data in IoT," he acknowledged, noting that crunching the data should begin before it ever reaches the Cloud. "It needs to be processed in layers. For example, data generated by a jet engine needs to be processed locally on the jet engine first and converted to what we call information, because any information you generate directly on the jet engine while the plane is flying can be acted on instantly. The moment you move the data further away from the jet engine, the loop-closure time increases."

After information, the next step is knowledge, which requires storing information and analyzing it using simulations or other analytical processes, explained Chand. "An example would be predictive diagnostics or predicting failure," he noted. "Once you have the knowledge, the next goal is wisdom, which comes from analyzing multiple jet engines and then figuring out how you redesign certain components to optimize performance or pre-empt a type of failure that you see across hundreds

of engines. It has to be thought of in those layers or you get overwhelmed."

That thinking resonated with Jeff Silver, CEO of the logistics transportation company Coyote Logistics. Five years ago, he noted, sensors on refrigerated trucks could tell you after the fact the temperature of beverages during transit. Today, the technology has advanced to the point where data is available in real-time—during transit. "When a load of orange juice is about to get ruined, you know about it immediately and have a fighting chance," he says. "Over time, we'll take it to the next level and be able to predict when those units will fail before they actually do."

Ultimately, that's one of the many

roads companies that embrace IoT will travel, improving efficiency by monitoring and tracking the health of your assets. "IoT is really not as much about the technology—although advances in technology are what enables it—but about taking a step back and understanding how you want to change your business," says Edson. "It's a business process evolution of what you're already doing and a way to move your business forward in the digital age."

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