BIG DATA TRENDS IN
MANUFACTURING

Three IT Professionals Who Are
Leading the Way

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THE MANUFACTURING CLOUD

Claude E. Shannon has been called the reluctant father of the digital age. A brilliant mathematician and self-described tinkerer, he showed how information could be transmitted in binary digits, or bits. With the advent of computers and software we went digital but most standard data were neatly managed in databases. Then the Internet came to life and almost everything we did could be captured by strings of ones and zeroes, creating a tsunami of unstructured data generated from our digital interactions: email, social, online shopping and more.

HOW BIG IS BIG DATA?

The digital universe is growing 40 percent a year into the next decade, including not only the increasing number of people and enterprises *doing* everything online, but also all things *being* online – smart devices connected to the Internet, unleashing a new wave a opportunities for businesses and people.

2013
4.4 ZB

2020
44 ZB
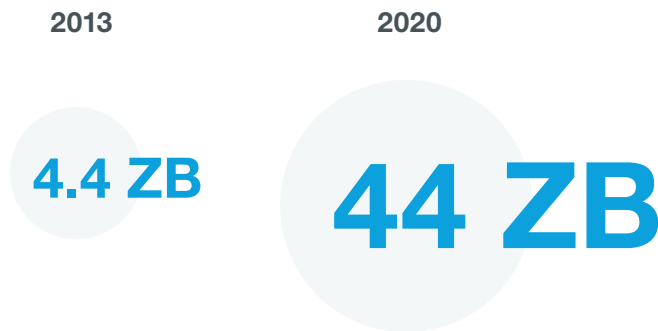
Source: EMC Digital Universe with Research & Analysis by IDC, April 2014

FYI

WHAT IS ZETTABYTE?

1,000,000,000,000 gigabytes
1,000,000,000,000 terabytes
1,000,000,000,000 petabytes
1,000,000,000,000 exabytes
1,000,000,000,000 zettabyte

Wait, there's more: A yottabyte is a mind-boggling 1,000,000,000,000,000,000,000,000 bytes.

If a Gigabyte were equal to an 11 oz cup of coffee, then a Zettabyte of coffee would equal the volume of the great wall of China.

Source: Cisco Visual Networking Index

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BENEFITS OF BIG DATA FOR THE MANUFACTURING VALUE CHAIN

	R&D and design	Supply-chain mgmt	Production	Marketing & Sales	After sales service
Build consistent interoperable, cross-functional R&D and product design databases along supply chain to enable concurrent engineering, rapid experimentation and simulation, and co-creation.	●				
Aggregate customer data and make them widely available to improve service level, capture cross-and-up-selling opportunities, and enable design-to-value.	●			●	
Source and share data through virtual collaboration sites (idea marketplaces to enable crowd sourcing).	●			●	
Implement advanced demand forecasting and supply planning across suppliers and using external variables.		●	●	●	
Implement lean manufacturing and model production virtually (digital factory) to create process transparency, develop dashboards, and visualize bottlenecks.			●		
Implement sensor data-driven operations analytics to improve throughput and enable mass customization.			●		
Collect after-sales data from sensors and feed back in real time to trigger after-sales services and detect manufacturing or design flaws.			●	●	●

Source: McKinsey Global Institute analysis

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MANUFACTURERS ARE FINDING BUSINESS OPPORTUNITIES AT THE JUNCTURE OF CLOUD, BIG DATA AND IoT

From inventory tracking to supply chain transparency, manufacturers have always been pioneers in the capture and use of data for real-time business operations. But today's leaders are taking that up yet another notch: to gain a competitive advantage, manufacturers must have tools and systems in place to collect, combine and analyze vast volumes of product, production, customer and market data in order to inform business strategy. Manufacturers are finding that cloud-based business applications and cloud storage allow them to replicate best practices and technical advancements quickly throughout their global enterprises.

Respondents to the 2014 State of Manufacturing Technology survey list cloud software among the most important technologies in strengthening their competitive edge in the next five years. The ability to connect and manage all the resources on the shop floor has a dramatic impact on virtually every aspect of manufacturing, according to survey participants. Not only do respondents see improvements in information and process flows, but they recognize that the cloud has directly enabled improvements in product quality.
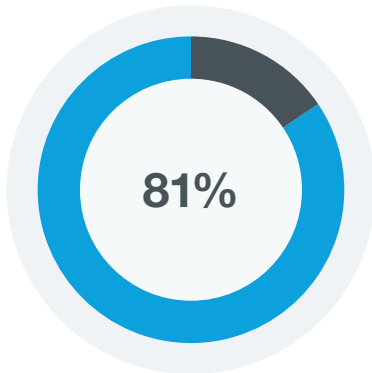
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OPPORTUNITIES TO LEAD

Mobile, social, big data and cloud technologies will collectively redefine 90% of IT roles by 2018, with estimates that in two years, more than 70% of CIOs will change their primary role from directly managing IT to becoming an innovation partner of the company.

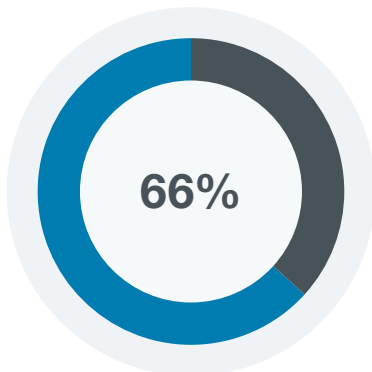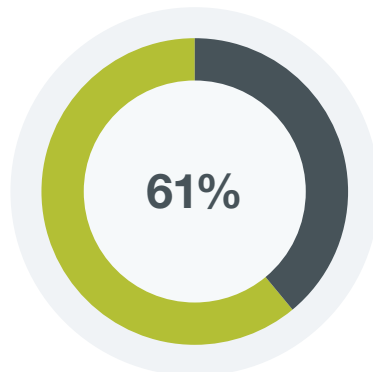Source: IDC Market Predictions for 2014: CIO Agenda

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WHY THE CLOUD MATTERS

81%
improved mobile access to data
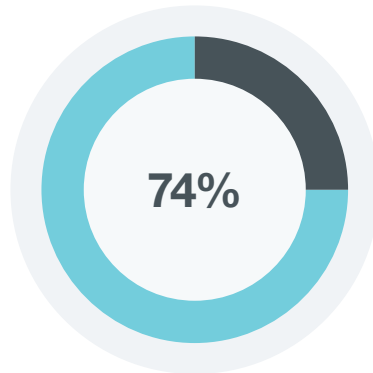
74%
better process integration

66%
improvements in plant productivity

61%
experience better quality

Source: The 2014 State of Manufacturing Technology Report

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CEO SENTIMENT ABOUT IT

The majority of business executives are underwhelmed about advancements in their companies' information technology organizations.

70% viewed technology as increasingly important to the business.

52% rated their IT innovation as poor or narrowly progressing.

43% IT groups are becoming a strategic, responsive and value-added business partners.

Source: Business Performance Innovation (BPI) Network Survey of Business Leaders

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MOVING TOWARD A CONNECTED FUTURE WITH THE IoT AND BIG DATA

The IoT and big data are clearly intimately connected: billions of Internet-connected 'things' will, by definition, generate massive amounts of data. As EMC and IDC point out in their 2014 Digital Universe report, organizations need to hone in on high-value, 'target-rich' data.

5 Criteria To Extract Maximum Value From Data

1 **Easy to access**: Can you obtain the data or is it locked away on end-user PCs, shuttling about on closed-end data processing systems, or trapped in proprietary embedded systems?

2 **Available in real time**: Are the data available in real time, or does much of it come too late to drive real-time decisions and actions?

3 **Organizational impact**: Could analysis of this data affect a lot of people, major parts of the organization, or lots of customers?

4 **Transformative**: Could this data, properly analyzed and acted upon, actually change a company … in a meaningful way?

5 **Intersection synergy**: Could this kind of data have more than one of the above attributes?

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50% of manufacturers use connected tools and sensors.

80% of manufacturers incorporate consumer mobile devices into operations.

25% use low-power Bluetooth to track the movement of materials.

50% of the traffic in the Plex Manufacturing Cloud is machine to machine.

Source: 2014 SOMT Report

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THE CONNECTED PLANT FLOOR

For years, manufacturing has depended on a rich network of machines, tools, materials, products and people. These highly customized networks are transforming into a standards-based Internet of Making Things on the shop floor, encompassing suppliers, customers and transportation systems.

When machines and tools are connected to the cloud they can talk to information systems and provide access to real-time operational data through any browser or mobile device regardless of location. From an IP-enabled torque wrench to a barcode scanner, connected tools and machines increasingly interact with manufacturing systems for a continuous, two-way data exchange.

Networks connecting all aspects of production enable manufacturers to see and act on live data and shop floor transactions incorporating people, machines, and materials to control, manage and continuously improve manufacturing activity.

All of these manufacturing IT Leaders found the solution to their data challenges in the cloud. By deploying a cloud ERP system from Plex Systems, they connected their best minds to analytical tools and real-time data that make faster, smarter decisions possible.

FYI

The manufacturing sector led adoption of connections (cellular, fixed line, satellite, and short-range wireless, an increase of more than 200 percent from the prior year.

Source: 2014 SOMT Report

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MANUFACTURING IT EXPERT INSIGHT

Scott Tollafield

Director of Information Technology, Fisher and Company IoT and Wearables

Context: Fisher and Company is a leading manufacturer of automotive seating components with 9 facilities in 4 countries.

NEED	• Make hand-held barcode scanning simpler and quicker • Enable mobile supervisory insight into the status of work centers
ACTION	• Deploy Google Glass connected to a wearable wrist scanner via the Plex Manufacturing Cloud • Deploy Google Glass connected to an iBeacon sensor to enable location awareness via the Plex Manufacturing Cloud
RESULT	• Reduce the time a worker spends scanning barcodes by 30-minutes per shift • Make it easy to scan containers out of reach • Enable supervisors to see the status of a work center by simply walking past

Watch the video

Scott Tollafield
Director of Information Technology
Fisher & Company

TOLLAFIELD ON THE BENEFITS OF CONNECTING THE PLANT FLOOR WITH PLEX

"The Plex story is the ease of access no matter where you are. That was an unexpected bonus for us [the IT department.] The effort that we would have spent to keep systems running, to keep everybody accessing the system and providing all of that capability, is now moved off to Plex and into the cloud. Being in 4 countries, it makes it easier to give everybody access no matter where they are and who they're visiting."

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MANUFACTURING IT EXPERT INSIGHT

Paul Wright

IT Director, Accuride Corporation

Context: Accuride Corporation is a leading supplier of wheels and wheel-end components to the North American commercial vehicle industry.

NEED	• Data was disconnected from the reality of Accuride's plants • Spending more time gathering and interrogating data than making decisions with it
ACTION	• Stepped into multiple Plex modules at once. Because it's connected within one database, we stepped from MRO into maintenance, then quality into production and shipping.
RESULT	• A single version of the truth with data sets that were consistent across all operations • 30-minute requisition approval from five executives, each traveling in a different time zone

<u>Watch the video</u>

Paul Wright
Director of Information Technology
Accuride Corporation

WRIGHT ON THE BENEFITS OF PLANT FLOOR DATA INTEGRATED IN THE CLOUD

"At Accuride, we already see the early benefits of greater enterprise integration and now have better insight into trends. For example, if orders decline, we can determine if it is limited to a specific geography or reflects an overall shift in the market. If a supplier's lead-time changes, we can uncover the commodity causing the delay and pinpoint which parts of production will be affected."

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MANUFACTURING IT EXPERT INSIGHT

Steve Carlson

Director of Management Information & Operational Planning

Context: FloraCraft is the world's largest maker and supplier of Styrofoam brand foam products.

NEED	FloraCraft shifted its strategy to mass-market production, almost tripling its inventory to 12,000 products and a portfolio of 3,500 SKUs. While expanding its workforce to more than 300 employees in the US and Mexico, the company outgrew its data management technology.
ACTION	FloraCraft uses the Plex Manufacturing Cloud to forecast its need for materials, monitor workstation performance, track inventory, conduct financial reporting, and monitor employee and shop performance.
RESULT	• 20% increase in overall revenue • 50% increase in revenue with largest customer, Wal-Mart • 2014 Wal-Mart Supplier of the Year

Watch the video

Steve Carlson
Director of Management Information & Operational Planning
FloraCraft

CARLSON ON THE BENEFITS OF REAL-TIME DATA FROM THE PLANT FLOOR

"One key to the project's success was extensive training of employees, especially the tech novices on the shop floor. We set up simulated kiosks in our factories and trained, trained, trained our associates. It has elevated all of our users out on the floor to be pretty tech-savvy, and they're all really proud of it."

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3 BIG DATA TRENDS IN MANUFACTURING

#1: Monitoring Product Quality Proactively

Manufacturers already provide incredible amounts of data on their products' construction and testing, establishing up front that they're producing high-quality products. Soon, they'll be able to eliminate statistical process control from their quality control process. Instead, manufacturers will use today's increasingly affordable sensors to gather real-time data on every item that comes off the assembly line. The bottom line will be greater accuracy with less human involvement.

#2: Seeing the Future and Changing It

Operational analytics are great at telling us what just happened and why. Predictive analytics tell us what's about to happen. Prescriptive analytics show us how to make machines do what we want. Both require vast amounts of data and the ability to analyze it effectively in order to deliver business intelligence. As the Internet of Things continues to mature, manufacturers will automatically gather more data and use it to both predict the future and to change it.

FYI

31%
of manufacturers are evaluating their big data needs & opportunities

35%
of manufacturers believe data analysis is the most important netx-gen skill set

Interoperability between IoT systems is critical. Currently, most IoT data are used to detect and control anomalies – not for optimization and prediction, which provide the greatest value.

Source: 2014 SOMT Report

Source: June 2015 McKinsey Global Institute Report: Unlocking the Potential of the Internet of Things

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#3: Getting Customers into the Data-Collection Game

The winners in our new data-driven economy will be the companies that can gather vast amounts of data and turn it into actionable processes within their supply chain. For manufacturers, the data gathering doesn't stop at the boundaries of the organization—it includes information collected at customer sites. Products with embedded sensors will extend the quality control process beyond purchase, resulting in higher levels of performance, better design, longer lifespan and information that covers the entire product lifecycle.

"Data is only as good as the intelligence we can glean from it, and that entails effective data analytics and a whole lot of computing power to cope with the exponential increase in volume."

MATTHEW WALL, TECHNOLOGY OF BUSINESS, BBC NEWS

FYI

Larger companies ($1billion or more in annual revenues) are struggling with unsuitable organizational structures and inflexible business processes. According to the respondents, the structures and processes function with legacy channels but are hindering their companies' efforts to take advantage of new digital opportunities.

Source: The Digital Tipping Point, McKinsey 2014 Global Survey

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CONCLUSION

This kind of innovation relies on a delivery agent that can put vast amounts of data at the fingertips of every stakeholder. Traditional ERP systems only create roadblocks. But cloud-based business applications and cloud storage let manufacturers replicate best practices and technical advancements quickly throughout their global enterprises.

With the cloud, every worker, every forklift, and even every wrench will tap into vast volumes of data to improve the way they work. It's a platform for dramatic change on a global scale.

ABOUT PLEX

Plex is the Manufacturing Cloud, delivering industry-leading ERP and manufacturing automation to more than 400 companies across process and discrete industries. Plex pioneered Cloud solutions for the shop floor, connecting suppliers, machines, people, systems and customers with capabilities that are easy to configure, deliver continuous innovation and reduce IT costs. With insight that starts on the production line, Plex helps companies see and understand every aspect of their business ecosystems, enabling them to lead in an ever-changing market.

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