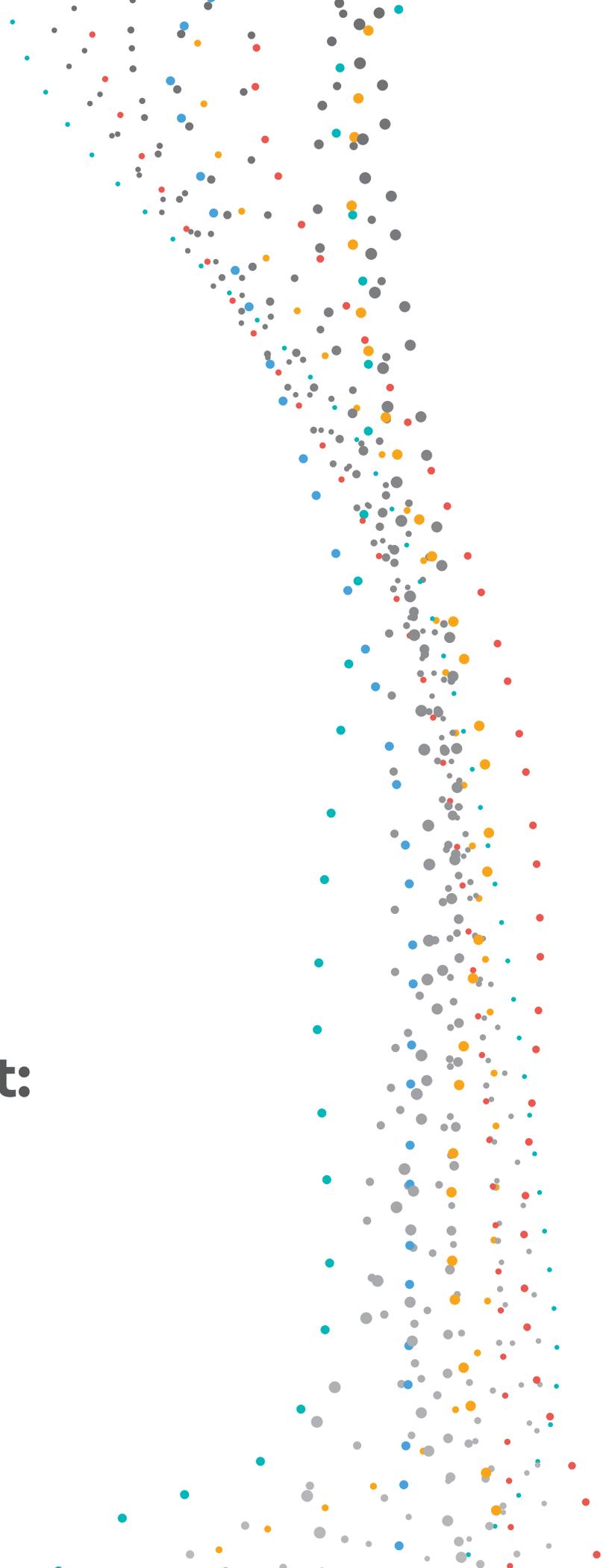




Innovation Report:

How Big Data
Will Change
Manufacturing
Forever.

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Summary

Big data has real world applications in just about every industry. But how will it impact manufacturing?



Michael Tucci,
CEO and President

Part I: Introduction

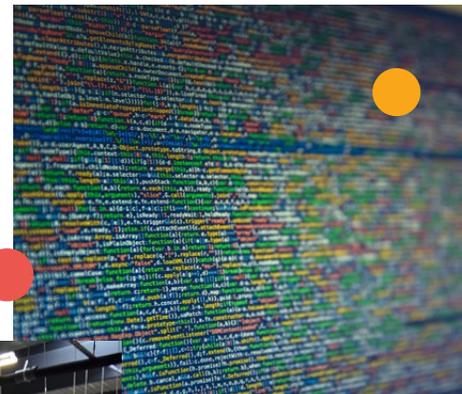
In a recent report, McKinsey states that manufacturing is the largest opportunity area of any industrial category for big data. PwC adds:

“

“The Internet of Things is the growing skein of connectivity between objects equipped with the ability to gather, store, process, and send data either through communication protocols to the Internet, or directly to other things or to an Internet gateway.”

The result of all this activity is more data, and specifically, more real-time data. What we do with this data and how we manipulate and analyze it in intelligent ways will be the key to successfully leveraging big data power in our businesses.

Many predict that trillions in value creation will occur from the Internet of Things in the next 10 years, and big data is set to be next billion-dollar-plus industry. How it impacts manufacturing as an industry remains to be seen, though there are some strong indicators worth taking a look at.



Part II: The Case for Big Data

Lean manufacturing and six-sigma revolutionized the ability of manufacturers to reduce waste and increase efficiency, which in turn allowed factories to produce higher quality products with higher yields. The next revolution in production process improvements will live in computational advanced analytics, which organize, manipulate and interpret large data sets to provide insights to guide continuous improvement for the largest impact.

Within big data lies an incredible opportunity to improve operational efficiencies and processes and transform entire business models. For manufacturing specifically, the case for big data is clear because manufacturing produces enormous amounts of data. This is due, in part, to the complexity of manufacturing systems, which has two sources:

1. Many Moving Parts

Manufacturing a part involves a long, complex path full of custom tooling, assembly lines, robotics, human involvement and logistics. Within that process, we sometimes use traditional techniques and other times more novel and innovative ones. If every interaction is measured, the amount of data that is created is enormous. It has been possible for many years to record and store all that data, but sorting through it to find actionable information was problematic.

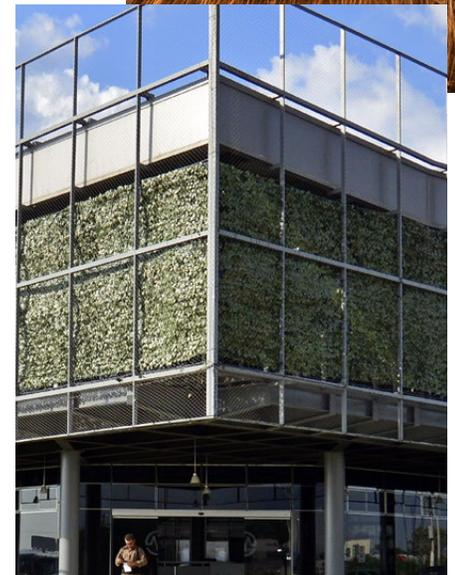
2. Manufacturing Diversity

If a company only made one product, then the data associated with manufacturing it might be manageable using traditional analysis. However, many manufacturers produce a large variety of products, with an overlap of machines, people and processes. This amplifies the volume and complexity of the data recorded in ways that make it very difficult for humans to sort through, gain insights and achieve peak optimization. At best, the result is an inefficient use of the data at our disposal. In these situations, big data analysis produces results far greater than those of conventional methods.

Part III: From Having Data to Using It

As we consider the big data that is present within our current processes and overlay that on the historical data from the past, we start to see historical trends and gain insights that might change the way we manufacture. The reason the opportunity for such large-scale change exists is because there are many optimization and disruption points for a manufacturer to engage in. Big data touches on automation, inventory, processes, materials, logistics, tooling, delivery, global routing and many other aspects of a business. All of these can be disrupted and changed based on insights from big data analysis.

This abundance of real-time data that we now possess gives us unprecedented access to information we could never have dreamed of owning in the past, but the challenge is figuring out what to do with it. Big data is valuable in decoding the data and gleaning important insights from it. With big data, we move from just storing data to making decisions using computational analytics, which is how we will change manufacturing. service costs and long-term expenditures while increasing efficiency and equipment lifespan.



Part IV:

Why Big Data Will Have a Significant Impact

Reason 1: Identifying Patterns and Historical Trends

Using the data sets of past and present will help us map trends and better forecast each stage of the manufacturing process for optimization. Using big data, we can manage each stage of integrated processes in need of improvement. Again, this is especially valuable when we manufacture multiple parts using similar or identical machines and systems

Reason 2: Optimizing Processes and Prioritizing Improvement Points

Prioritizing the right data is key and big data will enable optimization of the "whole" based on the "parts" by drilling into the factors that affect singular functions as points in the process. These singular functions can impact the whole in ways we never realized. We'll also find that laborious tasks like quality assurance can be automated, optimized and improved dramatically using big data.

Reason 3: Virtualized, Low-Cost, Fast Simulation

Big data lets us design and simulate an entire process before anything is even built, reducing supply chain risk and better forecasting an entire operation before we begin.

Reason 4: Gaining Unexpected and Actionable Insights

AI is changing the landscape of the industrial world in significant ways. It is being used to reduce labor costs, shorten unexpected downtime, and increase production; it has already produced staggering results. Combined with AI, the opportunities for decoding big sets of data are endless. Beyond just rules-based algorithms, AI will enable businesses to gain insights we were never even looking for and recommend decisions we didn't know we could or should make.

Reason 5: Leveraging the Connected World

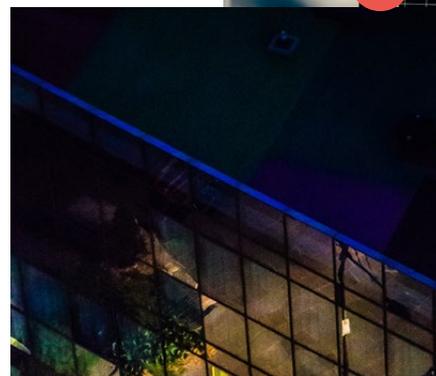
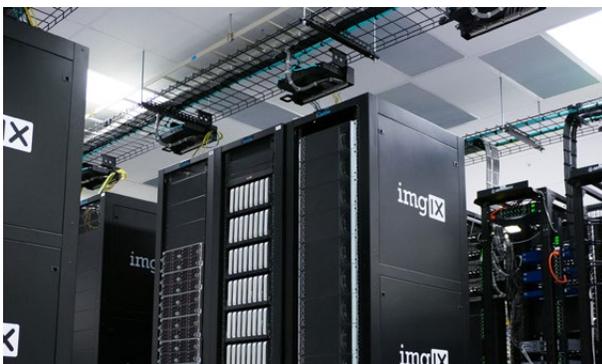
We live in a time of increasing global delivery points, complex global logistics and suppliers on almost every continent. Simplifying and improving the supply, inventory management and delivery model will be best done with big data.

Part V:

The Possibilities

The challenges to ensuring the usefulness of big data will be packaging insights clearly and with a digestible visualization of results. Even where the most helpful data sets are present, unless we publish in a way that makes sense to the decision makers, progress will be limited.

What's amazing to consider is that even in the most productive environments, there will be opportunities to increase yields and efficiency and decrease waste, because big data insights will provide meaningful information not accessible by human-led initiatives.





Part VI: Additional reading

- <https://www.mckinsey.com/business-functions/operations/our-insights/how-big-data-can-improve-manufacturing>
- <http://www.ingrammicroadvisor.com/data-center/4-big-data-use-cases-in-the-manufacturing-industry>
- <http://knowledge.wharton.upenn.edu/article/big-data-analytics-can-transform-manufacturing/>
- <https://www.pwc.com/us/en/industries/industrial-products/library/next-manufacturing-big-data.html>



Contact us today

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

We invite you to contact us to learn more about the integrity built into our systems and processes.

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