Micro

Innovation Report: The Manufacturing World Will Change Dramatically in the Next 5 Years: Here's How

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Contents

Summary

The manufacturing industry is undergoing enormous change. Many experts have stated that we live in the single most important time for manufacturing in the last 100 years. With the new industrial revolution upon us, manufacturers and industry stakeholders alike are wondering how to keep up and get ahead of the curve. At the same time, they understand that traditional methods take time to update and innovate, so the key is adaptability and integration of new technologies and processes over time.

Michael Tucci,
CEO and President

Part I: Introduction

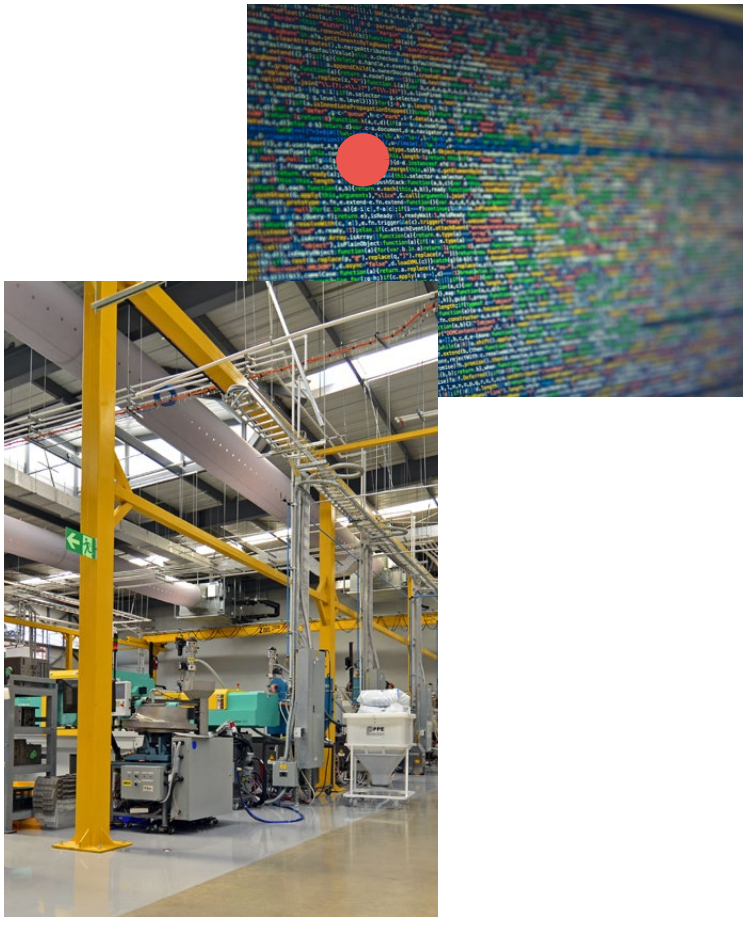
While industry agility and responsiveness to new technology is improving, manufacturing as a business model is not set up to adapt quickly, if for no other reason than client adaptation taking time. Any way you look at the matter, though, adaptation must happen; most players are thinking about survival while simultaneously wrestling with the understanding that this won't happen overnight.

Technological advancements will cause shifts to our manufacturing processes and tooling that will rapidly disrupt the industry as we know it. Because of the rapid pace of change and the time needed to pivot, it's vital to look ahead now, uncover the trends taking place, and create an integration roadmap.

In his book, The Fourth Industrial Revolution, Professor Klaus Schwab says:

> “We are in the middle of another industrial revolution - our fourth, and it's powered by advancements like additive manufacturing, smart manufacturing, robotics, artificial intelligence and the Internet of Things (IoT).

It's estimated that manufacturers alone will invest $267 billion into the Internet of Things (IoT) by 2020. For manufacturers everywhere, and their clients as well, there is increasing concern about the impact of slow adoption of new technologies, combined with external factors such as rising labor costs, increased compliance costs and greater competition.



Part II: How to get ahead

To get ahead, manufacturers must focus attention on:

- Improving their processes
- Positioning themselves to their clients as innovative partners
- Investing in the capability of offering design solutions to challenges presented by clients
- Increasing their efficiency and output
- Winning the price war, where quality is a given
- Taking advantage of an increase in data available to them to drive improvement

Part III: Trends to Consider

Manufacturers looking to adapt for the future should consider these seven trends in creating a roadmap to integrating innovations into their businesses.

Trend 1 – Virtual Reality (VR) and Augmented Reality (AR)

VR and AR allow companies to simulate and test production lines before implementing them, enabling better, quicker and more cost-effective designs. AR can (and should) be included in assembly planning, maintenance planning, real-time support, quality assurance and assembly line fixes without halting production.

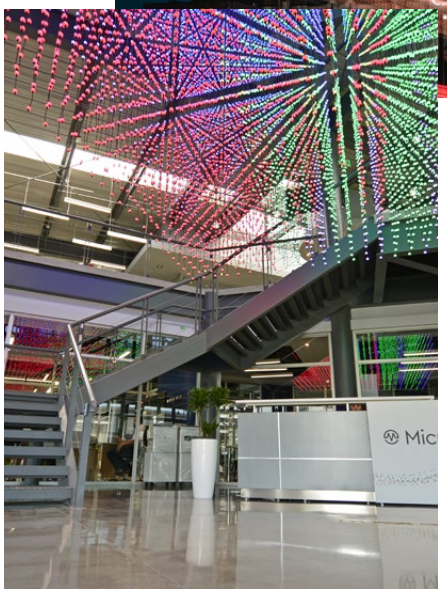
Trend 2 – 3D Printing / Additive Manufacturing

3D printing speeds up design, prototyping and testing of products and solutions, but that's just the tip of the iceberg. As 3D printing continues to advance in material availability and scalability, it will be easier to meet increasingly exacting standards demanded by clients—especially those with complex parts—and to produce in volume. 3D printing will impact the supply chain, spare parts inventories, cost accounting, speed to market and many more business functions. 3D printing has the potential to revolutionize manufacturing forever and the manufacturing workforce as well.

Trend 3 – Automation and Robotics

Robotics and automation are not new to manufacturing, but the ways they are being applied are constantly expanding and evolving. Decades ago they were used mainly for mundane tasks like welding, but more modern applications are more complex. For example, they are used to remove fault risk in industries that demand perfection such as those involving life-critical systems (where 0% fault is the benchmark). Managed by humans, robotic automation will offset labor shortages (even with increased parts demand) and increase overall productivity. That said, it takes careful strategic planning to integrate robotics into a manufacturing plant, and expertise must be acquired or contracted to assist in this process. As one example, for robots to work at peak efficiency, factory floors must be designed to accommodate free-moving collaboration among them.

Fueled by increased demands for speed, efficiency and productivity, companies will increasingly turn to robots to boost their workforce capacity and bottom line.



Trend 4 – The Internet of Things (IoT)

Daniel Newman, principal analyst at technology research and analysis firm Futurum, writes that the Internet of Things is

> "set to revolutionize the supply chain with both operational efficiencies and revenue opportunities."

As smart technology increases in virtually every sector, finding ways to integrate the IoT will be essential to leveraging the data available at each stage of the production process. Imagine, for example, having the ability to predict equipment failure before it occurs. The Internet of Things has the ability to deploy predictive maintenance to reduce service costs and long-term expenditures while increasing efficiency and equipment lifespan.

Trend 5 – Cloud Computing

The cloud is not new, but combined with the other trends presented in this report, it has the power to leverage processes such as supply chain analytics and projections to assist with many parts of the supply chain. Inventory readiness management, forecasting and overall efficiency improvement will all be leveraged via the cloud and its ability to securely store large warehouses of data and software virtually.

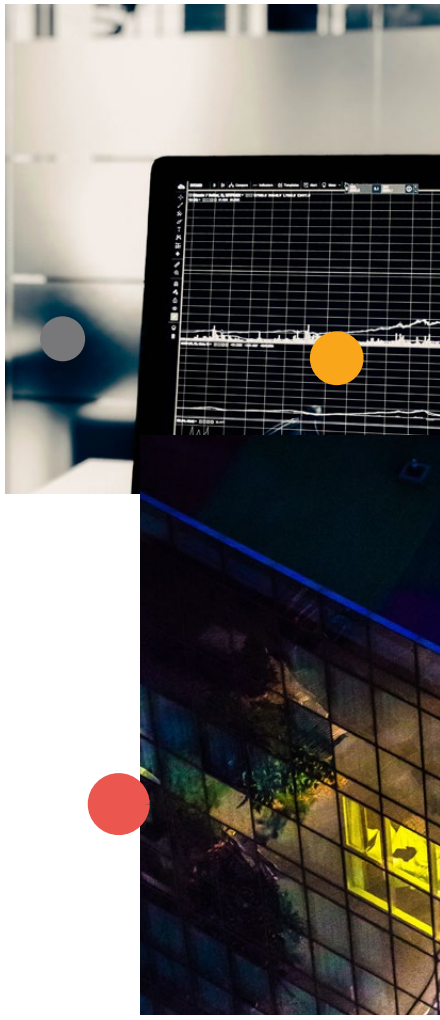
Trend 6 – Sensor 2.0

Advances in industrial technology and smart manufacturing over the past few years have been fueled by intelligent sensors. Combined with big data and the IoT, sensors not only help us understand what's happening inside the parts, components and machines we build, they help bring data sets together to provide true insights.

These smarter sensors can take plant data and send it back for processing, and some even perform their own processing in real time with no need for computational support. Sensors are the critical component for the factory of the future and all predictive maintenance, workforce and optimization will be tied to them. The Internet of Things, big data, artificial intelligence and collaborative robotics are all technologies that require new sensor technology to provide the underlying data upon which they work.

Trend 7 – Blockchain Technology

Applications of nascent blockchain technology are popping up everywhere, but it has yet to make a big impact in the manufacturing world. That said, interest in leveraging blockchain for the manufacturing industry is rapidly increasing. How this will manifest itself remains to be seen, but there is already talk about applying blockchain technology to auditing, supply chain management, inventory ledgers, and of course, the Internet of Things.



Part IV:
Additional reading

- https://www.weforum.org/agenda/2017/06/what-s-going-on-with-manufacturing-b013f435-1746-4bce-ac75-05c642652d42/
- https://www.gray.com/news/blog/2018/02/19/six-supply-chain-trends-that-will-impact-manufacturing-in-2018
- https://www.aem.org/news/january-2018/5-manufacturing-trends-to-watch-in-2018/ http://blog.mixerdirect.com/5-manufacturing-trends-of-the-future
- https://www.nist.gov/sites/default/files/documents/2016/11/16/iw_kronos_research_report_2016.pdf
- https://www.mckinsey.com/business-functions/operations/our-insights/the-future-of-manufacturing
- https://medium.com/@philippsandner/application-of-blockchain-technology-in-the-manufacturing-industry-d03a8ed3ba5e

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