The Emergence of Digital Manufacturing

What Digital Means for the Future of Manufacturing

The factory of the future relies on a digital thread that links the manufacturer, machinery like gas turbines, suppliers, shippers, distributers and end users. This digital thread allows for real-time data collection and analysis, enabling manufacturers to make informed decisions about production, maintenance, and quality control. Digital technologies, such as Big Data, Internet of Things, Cloud Computing, and Artificial Intelligence, play a crucial role in this transformation. By leveraging these technologies, manufacturers can improve productivity, reduce costs, and enhance customer satisfaction.

The Potential of Digital Manufacturing Implementation

- Reduced process variation: 50%
- Faster product development cycle: 20-50%
- Enhanced quality: 20-50%
- Increased labor productivity: 10-20%
- Increased bottom-line value: 20-50%

Challenges for Manufacturers

- What problems do you foresee?
- Lack of digital integration
- Cybersecurity concerns, especially proprietary data
- Delays in implementation due to cultural resistance
- Lack of coordination among departments and teams

Nine Technologies That Are Transforming Industrial Production

1. Cybersecurity: Ensuring data privacy and protecting against unauthorized access.
2. Internet of Things: Connecting devices and objects to gather data and improve operations.
3. Additive Manufacturing: Producing parts with complex geometries using 3D printing.
5. Artificial Intelligence: Analyzing data and making decisions to optimize operations.
6. Big Data: Collecting and analyzing large datasets to drive insights.
7. Internet of Things: Connecting devices to gather and share data.
8. Digital Twin: Creating virtual models of physical systems for testing and optimization.

When Does Your Company Plan to Implement?

- (1) Industry 4.0: How to Navigate Digitization of the Manufacturing Sector, McKinsey Digital, 2015
- (2) Industry 4.0: Building Your Digital Future, McKinsey Digital, 2018
- (3) 9 Technologies Identified by Boston Consulting Group, The Future of Productivity and Growth in the European Economy, pwc.com, April 2016
- (4) Industry 4.0: 7 Real World Examples of Digital Manufacturing in Action, South Represents the Future of Manufacturing, IoT World Today, 7/19/17
- (5) 7 Ways a Japanese Smart Factory in the Manufacturing Sector Averted Data Breach Risks, Frost & Sullivan, 4/28/17
- (6) Additive Manufacturing Cybersecurity Robotics, Paper by AWS and Frost & Sullivan, 12/5/19
- (7) 7 Ways a Japanese Smart Factory in the Manufacturing Sector Averted Data Breach Risks, Frost & Sullivan, 12/5/19
- (8) The Industrial Economy, 3/28/19
- (9) 10 Companies That Are Using Big Data, ICAS, 9/3/16
- (10) Kreg Case Study, 2/27/19
- (11) 10-20% of manufacturing companies are already using Industry 4.0 technologies, report from the National Network, NIST, 2019
- (12) The Potential of Digital Manufacturing Implementation, NIST, 2019