

How the current Industrial Revolution affects the MANUFACTURING VALUE CHAIN



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How the current Industrial Revolution affects the Manufacturing Value Chain

The transformation of current manufacturing practices to new ones in the framework of Industry 4.0 obviously led to a new market evolution. In the forecast year 2018-2028, the worldwide Factory of the Future market will grow by an amazing 13.2% CAGR, with over USD 339 billion in income. Due to transitional technologies like Internet of Things, big data analytics and artificial intelligence, advanced robotics and 3D printing, as well as cloud computing, a big sales share will continue to grow on the global smart manufacturing industry. There should be an increased growth in the smart factory industry, given the fact that important features emerge such as performance in real-time, superior intelligence, and the decentralization of manufacturing operations. In addition, increasing demand for production without time loss or products will have a positive effect on smart factory market growth, leading in lower energy consumption and improved manufacturing effectiveness¹. Innovations like sensors and actuators that are able to offer advanced automation alternatives will drive demand throughout the forecast period. Industrial IoT development will also increase the smart factory market worldwide. IIoT factory floor solutions for monitoring inventory, manufacturing systems, and supply chain management were implemented by manufacturing firms. On an additional level of automation, many systems and software allow users to communicate within factories with the recent ICT developments leading to state-of-the-art factories, not only on the inside but the outside as well, attaining a real-time commitment to all components of the value chain. The intelligent ecosystem paradigm will allow this disruptive effect on manufacturing companies.

MANUFACTURING PREDICTIONS
Worldwide manufacturing technology and industry forecasts 2018-2021

www.i-scoop.eu/industry-4-0/manufacturing-sector-manufacturing-technology-evolutions/

By 2020, 25% of manufacturers in select subsectors will have balanced production with demand cadence and achieved greater customization through intelligent and flexible assets
(IDC, November 8, 2017)

TOP 10 Worldwide Manufacturing Predictions

- Intelligent assets
- Ecosystems and experiences
- Embedded intelligence
- Data capitalization and industry clouds
- IT-OT organizations
- Customer-driven design
- The service gig economy
- The thinking supply chain
- Supply chain commerce networks
- Market-driven assets

By 2019, 50% of manufacturers will collaborate directly with customers & consumers regarding new & improved product designs through cloud-based crowdsourcing, VR & product virtualization, realizing up to 25% improvement in product success rates.

By the end of 2020, one-third of all manufacturing supply chains will be using analytics-driven cognitive capabilities, thus increasing cost efficiency by 10% and service performance by 5%

In 2020, augmented reality and mobile devices will drive the transition to the gig economy in the service industry, with "experts for hire" replacing 20% of dedicated customer and field service workers, starting with consumer durables and electronics
(IDC, November 8, 2017)

Source:
https://idc-community.com/idc_futurescape_worldwide_2017_predictions/top_10_worldwide_manufacturing_predictions

ENABLING TECHNOLOGIES FOR INDUSTRY 4.0²

The **Internet of Things** (IoT) connects devices through embedded technology in order to communicate and be able to interact with other distributed or centralized devices. **IIoT** relates to the industrial use of said technology.

In **Big Data and Analytics** framework, in order to improve and optimize procedures and services, the big quantity of information produced by new technology based on IIoT and Cybernetic Systems can provide us with a predictive tool capable of forecasting failures that can arise from industrial procedures through abnormal sensor measurement or probability calculation.



Cloud computing is based on the use of network services (software and storage) without physical infrastructure for providing such services, meaning that another infrastructure is used for providing those services from a different geographical place. One more highlighted technology using real physical environments is the **Augmented Reality** enabling the provision of data in real-time. This technology is a strong instrument for supporting manufacturing procedures and improving decision-making through the retrieval of data. The **Additive Manufacturing** with a special focus on 3D printing allows the production of complex parts at a competitive cost, reducing logistics costs and facilitating the production of small series or prototypes. The introduction of fresh technology into the manufacturing setting based on the Internet and open-source software requires more reliable and robust IT systems to maintain company protection, privacy, and safety. **Collaborative robots, Artificial Intelligence (AI), Drones and Simulation** is emerging high performance technology trends shaping the future of manufacturing with respect to increasing autonomy, flexibility and performance enhancement of the whole production facilities. Last, but no least, we point out the **Digital Twin** concept which will potentially be among the most disruptive contributions to the manufacturing integration. This technology is being used in the industry to create virtual models of any service, product or hyperconnected process enabling their optimization due to the information and intelligence gathered.



HOW TO MOVE THROUGH THE MANUFACTURING DIGITAL TRANSFORMATION?

Both the gap in abilities and the lack of talent in employees is increasing. For manufacturing clients, environmental sustainability has also become a necessity. Fortunately, technological developments are giving us the chance to influence individuals, society, and the planet positively. Globally, manufacturers are being upset and moved from the manufacture of products to service delivery. Manufacturing companies have to change their focus from engineering and production to client results in order to compete and develop. In this way, a modern manufacturing organization needs to focus on four key transformation areas in order to take full advantage³:

- **Empowering Workforce**
Training current staff at the pace of innovation in order for the next generation of skilled workers to become more attracted. With completely equipped and empowered staff, the general job satisfaction, productivity and streamline decision-making will be improved.

- **New Service Delivery**
For example, predictive analytics is the number one case for manufacturing companies. Manufacturers can decrease waste, maintenance costs, and downtime by investing in equipment using IoT and identifying failure avoidance patterns.

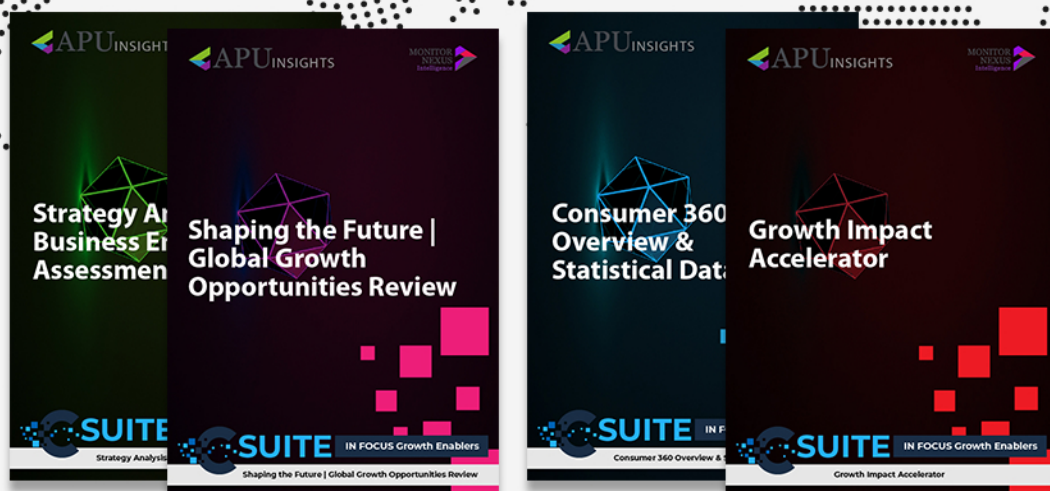
- **Digital Operations Optimization**
By embedding AI into current products and processes, you can supply personalized and intelligent assistance, predictive maintenance, and remote monitoring, even if products have departed from the factory.

- **Redefining Manufacturing**
For the sake of a decreased footprint, technologies such as digital twins, AI and IoT are used to track, regulate, and save water as well as power. Modern agriculture, using these techniques, has the means to contribute to the production of more seeds and to guarantee food safety.

Becoming widely adopted and implemented, the so-called concept of the Factory of the Future along with intelligent supply chain approaches, is directly characterized as the main and necessary route for digital transformation.

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