

Digital Manufacturing Emerging technologies

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ABOUT THIS REPORT

This report focuses on the evolution of emerging manufacturing technologies and how they tend to be adopted by innovative enterprises. Modern manufacturing organizations urgently need to transform their operations and approaches referring to the growth demand of customers' satisfaction in order to survive the extremely competitive business environment.

The data collected and used for this report is based on the research data and insights on macro trends, industry dynamics, key performance, and operational metrics on a range of company performances and activities for leadership improvement on manufacturing industry best practices. More particularly, we use our extensive knowledge of companies and industry relationships, patent, and academic journals searches, Institutes and University associate links to frame strong visibility in the market and technology.

We based our efforts on qualitative research data and insights to evaluate and analyze market data across multiple dimensions, to identify where market growth is occurring and capitalize on opportunities in manufacturing markets in order to enable you to develop successful product positioning strategies.



EXECUTIVE SUMMARY

Disruptive technologies revolutionize sectors as a whole. As the steam motor has industrialized contemporary culture, the Internet, IoT, cloud computing, and other cutting-edge technologies provide staff with opportunities to practice, clients to participate, and companies to flourish in unprecedented ways. Manufacturing industries present continuous challenges for technological evolution in order to efficiently respond to mass customization that the digital era imposes. For those who see it through, there are plenty of rewards: increased proficiency, more committed employees, and a dedicated customer base. However, C-level management must learn to handle the influx and influence of disruptive technologies for organizations to win at rupture. And, while organizations may articulate their disruptive technology and digital conversion approach, they often fail to implement this approach and deliver

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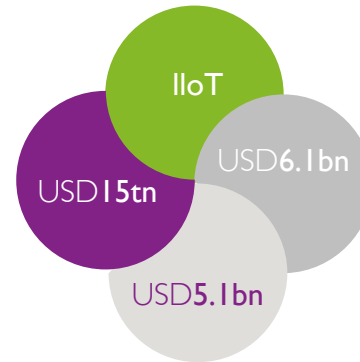
MARKET BRIEF

We have a time of fast change in which companies must make difficult choices in an alarmingly short time. With a broad spectrum of disruptive technologies and fresh business models, the greatest challenge encountered by companies is to understand their decisions. The wide implementation of intelligent sensor technology, the improvement of connectivity, and cloud advances helped to foster the implementation and development of Industrial IoT. The Industrial IoT (IIoT) is poised to have a major impact on manufacturing and the global economy, projected to create **USD 15 trillion of global GDP by 2030**.

In 2018, manufacturers spent USD 189 billion on IoT, the biggest amount than any other industry, with an emphasis on manufacturing and management of production assets. As more manufacturers seek to make their legacy systems more

intelligent, the market size for sensors and controllers has grown substantially and is projected to grow to **USD 6.1 billion by 2020**, up from **USD 5.1 billion in 2016**. Advances in robot manufacture have taken place with IoT, cloud computing, and artificial intelligence. Innovations in robotic technology have increased the adaptability, compactness, safety, and price of co-bots. They are most useful when they're powered by AI and by people that can enable their full potential (1).

The growing use of alternative energy sources and the ongoing life cycle assessment of products to measure their environmental impact are another



1. Microsoft Dynamics. (2019). 2019-Manufacturing-Trends.

expected outcomes. Those who are able to react to customer demand modifications and left-field disruptions are the most successful.

Many, whose current ground systems are struggling to provide the needed agility, could receive undesired news. Others will welcome the challenge and acknowledge it as a special time when the winners can truly do everything. The first critical element of connected manufacturing uses the Internet of Things (IoT) to connect 'dark data' (operational data that are not being used) to the IT systems that can turn this data into information. Once data becomes available, advanced analytics and machine-learning techniques enable manufacturers to draw valuable insight from their data which they can then use to increase the efficiency of their operations, improve productivity, and boost agility.

Increasing client expectations give worldwide manufacturers significant fresh income streams, but the environment is rough. Wage rates rise fast in some cost-effective countries. Volatile resource prices, the rising shortage of extremely qualified talent, and increased supply chain and regulation risks generate a rather uncertain atmosphere.

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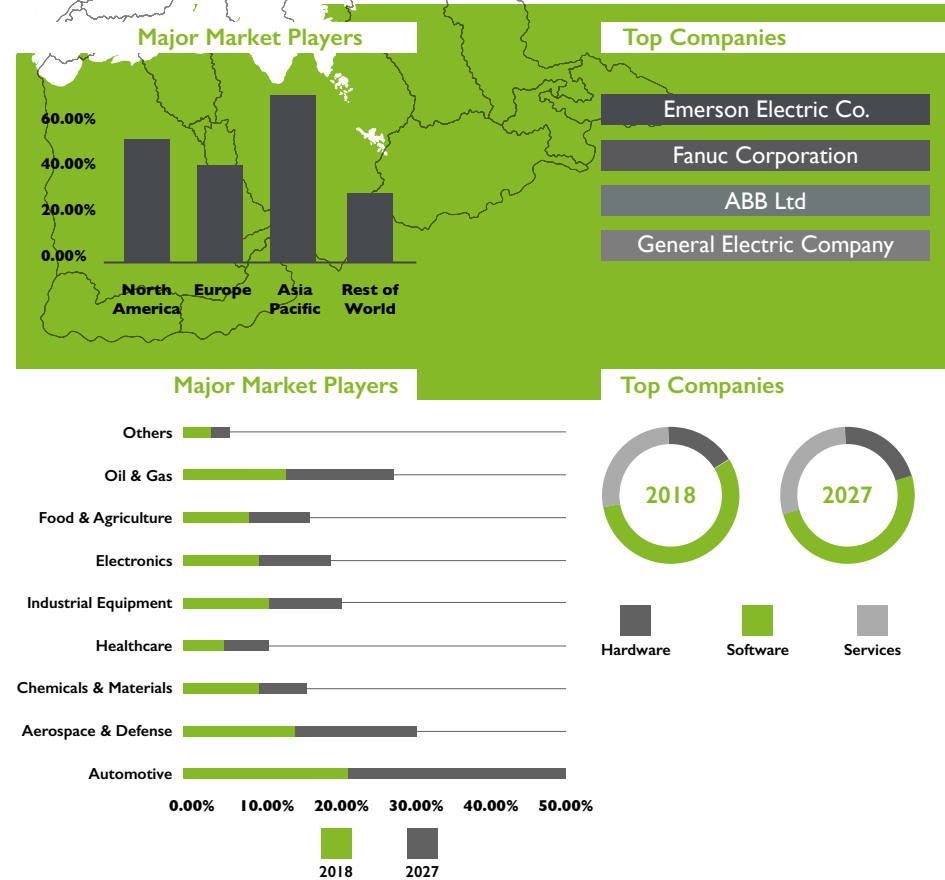
Best Practices & Innovation

technology that contributes to the present evolution of the manufacturing sector. Modern companies must simplify their activities, enhance shipping times and create better products in order to satisfy increasing client requirements. The landscape of traditional manufacturing is being changed with digitalization.

There are already many fresh alternatives just at the start of this development.

The game-changing tools around data analytics, artificial intelligence (AI), advanced robotics, augmented reality, and others promise great benefits when they are combined with the connective power of the Internet of Things (IoT). However, digital transformation could not be more strategic because in many companies it will represent a rethinking of their entire business and operating model. Executives must strike a difficult balance between traditional cost-efficiency measures to enable short-term profitability improvements and bold actions to change business models and drive long-term, revenue growth.

Figure 1 | Global Smart Manufacturing Market Forecast 2019 - 2027, Inkwood Research (2019)



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BEST PRACTICES & INNOVATION

Manufacturers have been aware of the impeding force of the fourth industrial revolution -the fusion of physical and digital manufacturing processes- for some time, but have nonetheless been hesitant to introduce their supply chains to digital frameworks. Thanks to advancements in cloud-connected technologies and a reduced implementation cost, these technologies are more accessible and impose less of a risk for today's industrial leaders to adopt. With today's accelerated market pace, increased supply chain complexities and new patterns of consumer engagement, manufacturers need to replace traditionally siloed manufacturing practices with active, forward-thinking solutions. By using connected software systems in their supply chains, like IoT sensors and real-time communication software, companies can better understand their tasks and react rapidly to their customers' requirements. It is simpler for companies to collect data on their everyday activities through the use of the Internet of Things sensors and cloud infrastructures more than ever before. With this knowledge at hand, production managers can obtain ongoing analyses to identify bottlenecks in their factories or inform them of inefficient operations. Over time, this data collection can help manufacturers accelerate output by allowing them to introduce real-time adjustments to their production lines.

The always-connected consumer and popularization of e-commerce platforms has resulted in increased supply chain pressures, with manufacturers needing to output goods faster and more efficiently to meet elevated demands. Consequently, manufacturers are turning to implement end-to-end digitization within their own supply chains to ensure agility and faster processes. As evidenced in these five scenarios, the path towards this digital supply chain is no longer locked in manufacturers' imaginations, but achievable by adopting a new generation of intelligent, connected equipment. The five leading technologies identified below will help guide manufacturers into digital supply chain transformation, essential in optimizing efficiency, agile operations, and increasing total production output.

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Best Practices include ⁽¹⁸⁾:

“
The backbone of the new generation of connected manufacturing and valuable maintenance abilities is **CLOUD CONNECTIVITY & IOT TECHNOLOGIES.**”

“
BIG DATA ANALYTICS enables producers to gather useful ideas from data troves.”

“
MACHINE LEARNING does not only accelerate the route to ultra-efficiency but also paves the way towards the fresh manufacturing generation as a service.”

“
REAL-TIME COMMUNICATION PLATFORMS make it possible for teams and cross-industry partners to share views or work together on projects in safe, virtual settings.”

18. PSFK & Microsoft. (2017). The future of manufacturing: blueprints for a connected supply chain.

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