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Quick Answer: Understanding Smart Factory, Industrie 4.0 and Smart Manufacturing

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Initiatives: Industry Product Planning and Strategy

Product leaders need to know how to explain to their manufacturing clients the concepts of Industrie 4.0, smart manufacturing and smart factory and discuss their differences in easily understood terms. This will eliminate confusion and clearly set expectations so that sales cycles aren't inhibited.

Quick Answer

What must product leaders understand about smart factory, Industry 4.0 and smart manufacturing when positioning their manufacturing solutions?

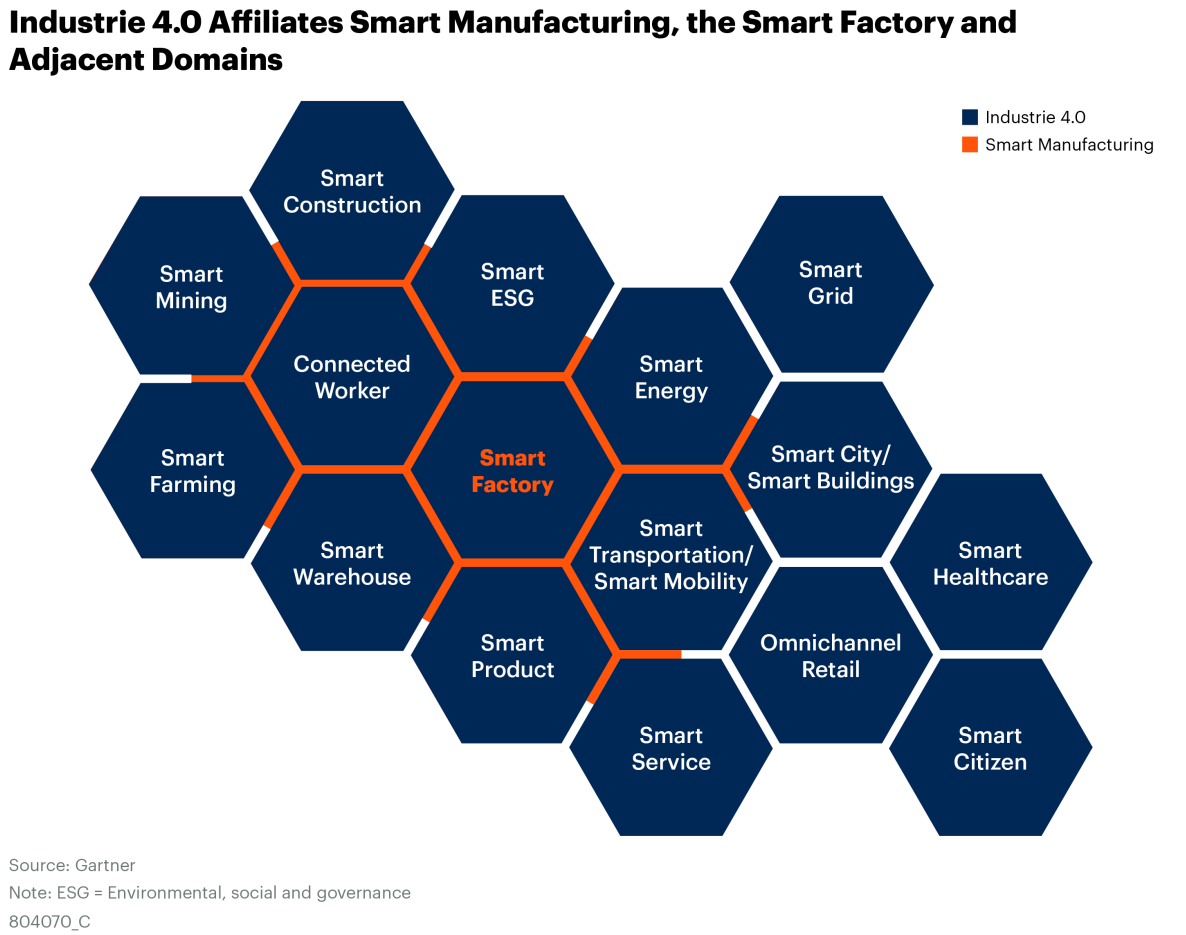
- The differentiating factor between these three concepts is the impact on the business, which spans from strategic to tactical to transformational. Each concept impacts the business differently. The interconnectivity between them is what creates the overlap and confusion.
- Smart factory is a "tactical" concept used to describe the application of different combinations of modern technologies with standard work to create a hyperflexible, self-adapting manufacturing capability.
- Industrie 4.0 is a "strategic" cross-industry vision enabling manufacturing enterprises to collaborate in ecosystems across value chains and different industries.
- Smart manufacturing is a "transformational" concept that integrates technologies, data, processes and human interactions to transform and improve production's response to changing conditions in and across factory networks and value chains.

More Detail

Technology and service providers often use smart factory, Industrie 4.0 and smart manufacturing interchangeably to describe their manufacturing industry solutions. The meaning of these terms for product leaders varies and impacts the positioning and scope of their portfolios. Adding to the challenge is buyers using different explanations of the same terms when describing their current and future manufacturing visions/roadmaps. Misalignment of terminology is often a root cause of a lack of joint understanding of project scope and requirements between a tech provider's marketing and sales teams and manufacturing buying personas. This can result in long sales cycles, poor customer experience and, in the worst case, loss of deals.

Industrie 4.0 is implemented through smart factories to support smart manufacturing processes across the supply chain, and even includes collaboration across manufacturing organizations' boundaries with stakeholders in a variety of other industries. Figure 1 shows which domains and industries are impacted by Industrie 4.0 and smart manufacturing.

Figure 1: Industrie 4.0 Affiliates Smart Manufacturing, the Smart Factory and Adjacent Domains



Smart Factory

The smart factory combines modern technologies and standard work to innovate how factories operate. Smart factories are an underlying capability of smart manufacturing and broader digital supply chain and Industrie 4.0 initiatives, providing an environment where frontline workers and technology interact in an open, connected and coordinated fashion.

A smart factory adapts to labor constraints and to external conditions, such as fluctuations in supply and demand for finished or semifinished goods being produced. This outside-in approach of making the factory respond to changing conditions with speed and flexibility must be met by bottom-up efficiency improvements and risk mitigation as new data and optimized processes emerge. This could range from dynamic scheduling, prediction of production asset maintenance intervals, and in-process quality inspection, through to the adaptive adjustment of production machinery settings.

Even though the number of lights-out processes in factories will increase over time, people will still be around in factories to monitor processes, make critical decisions or perform tasks that cannot be replaced due to lack of technical or economic feasibility.

Smart factory is further detailed in Innovation Insight for Smart Factory.

Industrie 4.0

Industrie 4.0 describes an adaptive industrial paradigm change reflected in the fourth industrial revolution, where rapid change to technology, industries, and societal patterns and processes will drive sustainable industrialization.

Industrie 4.0 represents the effects of the transformation of digitalization and hyperautomation strategies and vision on manufacturing. This transformation is impacted by the advances of the digital economy, including ecosystems such as smart buildings and cities. It provides a technical, data-driven and automated approach to outlining how manufacturing will change in the face of real-time data analytics and artificial intelligence (AI) . Industrie 4.0 also represents consortia built to shape standards and public policy, such as Plattform Industrie 4.0 and partner associations in Europe. [1]

The term Industrie 4.0 is commonly used as an ongoing vision for digital industrial economy transformation. Industrie 4.0 is further detailed in 5 Principles to Navigate the Industrie 4.0 Journey Toward a Digital Society.

Smart Manufacturing

Smart manufacturing is a concept that integrates technologies, data, processes and human interactions to transform and improve production's response to changing conditions in and across factory networks and value chains.

Changing market conditions (that is, shifts in demand for final products or shortages in supply of components, energy costs and raw materials) have a direct impact on production schedules and resource planning. Smart manufacturing relates to the digitalization of manufacturing operations, specifically:

- The execution of the production process supported by a variety of IT and operational technology (OT) efforts
- The workforce skills needed to support these new ways of working across different organizational boundaries

Changing customer requirements results in new products and variants that require rearranging entire factory layouts or even outsourcing entire manufacturing processes.

Smart manufacturing is further detailed in the form of a collection of use cases in Use-Case Prism: Smart Manufacturing.

Conclusion

Product leaders that sell their products and services under the umbrella of smart factory, Industrie 4.0 or smart manufacturing can fall under these categories:

- They would like to act as a trusted advisor (these are often consulting systems integrators) that aims to accompany their manufacturing clients across multiple phases of their digital transformation journey, which is often named an Industrie 4.0, smart manufacturing or smart factory initiative.
- They want to sell technologies — packaged business capabilities representing one or multiple use cases — and assign them to broader concepts of Industrie 4.0, smart manufacturing or smart factory, either directly or via above-mentioned trusted advisors.

Product leaders of technology and service providers must be able to communicate core concepts to align their manufacturing clients' expectations. Therefore, they should:

- Define the terms "smart factory," "Industrie 4.0" and "smart manufacturing" in marketing and sales material (webpages, sales decks and white papers).

- Educate customer-facing colleagues in sales, delivery and support roles to use these terms consistently in client and partner engagements by creation of playbooks with clear definitions of the three terms and consistent mapping of offered products or services.
- Prepare customer-facing colleagues to listen to their customers when they have a different understanding of these terms. In this case, joint definitions with the customer must be agreed to at an early stage and recorded in writing in offers and project documentation.
- Create messaging and storytelling to engage different buying personas based on their individual needs and KPIs by promoting use cases that relate to specific business and IT functions that extend the benefits beyond the manufacturing function.
- Accelerate sales, scoping and progress monitoring of client engagements by creation of a stage-based maturity approach that aligns the combination of capabilities, performance measures and technology.

Evidence

[1] Industrie 4.0 also has a formal component: Governments, industry associations and vendor-driven consortia have built formal organizations to shape standards and build networks and ecosystems to drive co-creation and joint development of solutions.

The initiating consortium was Platform Industrie 4.0, which aimed to make the vision of Industrie 4.0 executable by provision of standards, reference architectures (RAMI 4.0) , implementation guidelines and testbeds for its end-user organization and vendor members (see What Is the Plattform Industrie 4.0?, Federal Ministry of Education and Research) .

Due the foundational role of this consortium carrying the term “Industrie 4.0” in its name, Gartner decided to use the notation with an “ie” at the end. But spelling with “y” at the end is also broadly used.

Industrie 4.0 has been promoted by the European Commission since the very beginning and now has become a global initiative. The consortium currently holds partnerships with digitalization programs in many countries in Europe, North America and APAC (see International Cooperation, Federal Ministry of Education and Research. That also includes the Industry IoT Consortium, an open-membership organization with over 250 members from 30 countries. Industrie 4.0 has become a global vision.

Document Revision History

Quick Answer for Product Leaders: Differences Among Smart Factory, Industrie 4.0 and Smart Manufacturing - 10 June 2022

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