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Insights

# Smart factory 2.0

The old and the nuanced

FOR MANUFACTURERS, THE allure and strategic importance of "smart factories" are indisputable. For example, in a joint survey by Deloitte and MAPI, 86 percent of US manufacturers report that "smart factories will be the main driver of competitiveness in five years," and 83 percent of those surveyed believe that smart factories will transform the way products are made.[1]

## Nearly two out of three manufacturers surveyed report no progress on initiatives that they overwhelmingly point to as their main driver of near-term competitiveness.

How manufacturers get started and succeed in these smart factory efforts is a bigger challenge. Of the manufacturers we surveyed, just 5 percent report that they successfully converted one or more facilities to "smart" status, while only 30 percent report that they are currently implementing smart factory initiatives.[2] This means that nearly two out of three (65 percent) manufacturers surveyed report no progress on initiatives that they overwhelmingly point to as their main driver of near-term competitiveness.[3]

What's going on, and what lessons can be learned from those who *are taking action* that might help

others get started? Based on our ongoing research, this executive summary offers some emerging insights from individuals working on the front lines of smart factory transformations—those who are experiencing it and learning along the way. The full report will be published soon.

Thus far, our findings fall into two broad categories. First, we recognize "old" themes reminiscent of the long history of challenges that organizations face when it comes to any kind of transformation effort. We believe it is crucial to keep these in mind, lest we be lulled into a sense that the rules of organizational life are somehow different when it

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**OUR APPROACH**

Our research builds on and complements Deloitte's in-depth, collaborative study with MAPI, which investigated the state of smart factory deployment across the United States, as well as our 2017 smart factories study, which offered an initial exploration of the concept and its key considerations.[5]

Here we provide an overview of findings from a six-month qualitative, global exploratory study aimed at identifying, assessing, and documenting approaches to deploying smart factories. Our goal? To surface key insights from individuals working on the frontlines of smart factory deployments—those who are living it, experiencing it, and learning along the way. To date, we have conducted more than 40 semistructured interviews with a global array of individuals (manufacturing leaders, staff, and professional services providers) with hands-on experience deploying smart factories in diverse industries such as chemicals, paper, aerospace, plastics, and consumer products. Despite the range of industries, an overarching set of considerations, challenges, lessons learned, and strategies for success remained consistent.

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The smart factory is viewed as a flexible system that self-optimizes performance across a broad network, self-adapts, learns from conditions in near-real time, and autonomously runs entire production processes.[4]

comes to smart factories. Second, we see more nuanced themes emerge, resulting from the special contexts that smart factory deployments offer. Successful anticipation of these nuances seems to be influential to the ultimate success of smart factory efforts.

## The old themes

1. **Visioning:** Successful deployments typically aren't limited to a single technology implementation. They start with an overarching, holistic vision for what aspects of the factory can be transformed, to allow teams to build capabilities in pursuit of that broader goal. Rather than a project with a definitive start and end, smart factory transformations are often ongoing journeys to build adaptive, intelligent systems that evolve and grow over time.

2. **Clear drivers for change:** Many factors drive the desire for implementing smart factory technologies, but one overarching driver can also serve as the impetus for change and can serve as a north star to guide investment decisions. For example, one mining company we examined saw worker safety as the key driver of change. Many discrete manufacturers, on the other hand, prioritized improvements in productivity and cost. Others emphasized their competitive position in the market along with growth opportunities. Overall, we continue to find that aligning clear outcomes with the desire for change can support successful deployments.

3. **Internal champions and a top-down, bottom-up approach:** Change champions inside the business provide support at a leadership level as well on the ground to remove roadblocks, gain organizational buy-in, and outline the business case for smart factories. At the top of the business, project sponsorship is essential for directing resources and providing leadership support for the difficult work of technology deployment and organizational change. But it's not enough.

Leadership at the deployment level is also essential. These leaders are the ones who both understand the overarching vision and have the knowledge and credibility on the front lines (i.e., on the shop floor) to knock down barriers and drive change where it needs to happen.

4. **Cross-functional teams:** Diversity generates insight. Like any type of transformation, some of the most successful ones generally employ diverse teams representing key functions and cross-cutting capabilities. These might include engineering, information technology, supply chain, production, finance, and HR. Cross-functional representation can reduce the probability that important controls, processes, and cultural elements are not missed during the transformation effort.

5. **Postdeployment support:** Just like in a classic IT implementation, the success of a smart factory initiative is typically not realized upon the first deployment of new solutions. It often comes in the weeks and months that follow, when operators, engineers, and other staff integrate new technologies into their everyday "business as usual." Struggles come when new technologies or processes are "dropped" onto a shop floor without ongoing support. Staff are smart, and if they don't see the need or value of the new process, they could find ways to subvert or circumvent it and go back to what they know. Sticking around for a while can help.

## The nuanced themes

1. **The right infrastructure:** It goes without saying that factory floors are different than offices and *certainly* different from data centers. They can be hot or cold, dirty or clean, and both electromagnetically and audibly noisy. Many were built long ago with no thought of the digital world in mind. Moreover, even within the same plant network, each facility is very likely unique in terms of layout, equipment, and product. The deployment of smart factory technologies across the network will likely

demand a carefully crafted strategy for building a digital infrastructure that is scalable while also accommodating the unique demands of each environment. Missing this step at the early stages could lead to major issues later on.

2. **Information technology vs. operations technology:** This dichotomy does not simply define the different natures of digital and physical technologies; it also defines the cultures of the organizations within the business that support them. In support of the much-discussed need for cross-functional teams, we heard time and again about the miscommunications and differences in priority that can arise between the central IT organization and the shop floor. Much of this has to do with issues of security, production uptime (or risk of downtime), and data migration. Achieving both balance among competing priorities and understanding across very different professional cultures can spell the difference between progress and stalemate.

3. **Personas:** Continuing on the change management theme, we see tremendous progress in deployment via attention to the various "personas," or job functions and roles, that are represented in the smart factory (and related) environment. Persona development entails an attempt to understand the impacts of digital technologies on individual personnel. Many successful organizations are increasingly utilizing employee journey maps and personas to better articulate and understand how new processes will affect people and what strategies need to be developed to support successful adoption.

4. **Ecosystems:** Cross-functional teams have always been important, and it is normally true that organizational transformations involve bringing someone in to help. But when it comes to smart factory deployment, the breadth of the required help from outside the organization can explode. Sensors, platform partners, infrastructure providers, system integration

support, and more will likely be required to succeed. Success could depend not just on building the team with the skills to get the job done but also on finding the "coach" that can assist in driving all the disparate ecosystem partners in a direction that brings transformational success.

In general, and perhaps not surprisingly, our research indicates there is no single pathway to successful smart factory deployments, and challenges will always exist. Across the many people and organizations we are studying, the above themes appear consistently.

This also affirms the importance of "think big, start small, *and scale fast*." Communicating a vision for the future as well as plans for how to achieve it supports the case for adopting digital technologies, and moving to scale across the organization allows for learning and adoption of processes as you go. Aiming for the "low-hanging fruit" to show quick wins and justify return on investment in new technology can help achieve organizational buy-in. Piloting and testing in lower-risk locations of the company can also help organizations start small, learn, and adapt before scaling a solution.

Finally, we remind leaders of the importance of taking action. Manufacturers surveyed broadly agree that the future of manufacturing is "smart." A significant minority of manufacturing leaders surveyed are moving ahead on this front, so others risk being left behind. However, the current state of the market suggests that it is not too late. There is plenty to do and plenty of opportunity for value. It's time to get started.

> Stay tuned for our full report on smart factory 2.0, publishing in late 2019.

# Endnotes

1. Paul Wellener et al., *2019 Deloitte and MAPI Smart Factory Study: Capturing value through the digital journey*, Deloitte Insights, September 2019.

2. Ibid.

3. We further add that 19 percent of manufacturers report that they "haven't even thought about it."

4. Rick Burke et al., *The smart factory: Responsive, adaptive, connected manufacturing*, Deloitte Insights, August 31, 2017.

5. Deloitte, "2019 Deloitte and MAPI Smart Factory Study: Capturing value along the digital journey," press release, September 16, 2019; Burke et al., *The smart factory*.

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