



# Engineering Smarter Operations

Three Lessons From Manufacturers Who Have Successfully Transformed Operations With AI

**M**anufacturing has long been a testbed for cutting-edge technology. We've seen augmented reality headsets used to instruct engineers, machine vision quality inspections, and robotic arms building robotic arms. Because of this, the manufacturing industry is often considered a first-mover when it comes to technology.

The reality, however, is there's a big gap between these shiny case studies and an average manufacturing facility. "You get some really exciting examples, but it's not pervasive," says Chris Dungey, CTO at High Value Manufacturing Catapult. Manufacturing processes are complex—with a lot of literal moving parts—and safety stakes are high, so, despite the opportunity, widespread AI integration has been slow.

**“We’re having a rough economic time here in Europe right now, and what we’ve heard from companies is, ‘We want to do more, but with the same staff.’”**

Alexander Müller,  
cofounder of Workist

The same is true in the back office: in 2024 the Manufacturing Leadership Council found that 70 percent of manufacturers were still entering data manually. AI adoption in those roles has been stilted both because knowledge work often isn't rules based, so it's inherently harder to automate, and because the demand wasn't there. But automation is no longer just a nice to have.

“We’re having a rough economic time here in Europe right now, and what we’ve heard from companies is, ‘We want to do more, but with the same staff,’” says Alexander Müller, cofounder of Workist, a company that builds software to integrate AI into white collar work.

While we haven't yet seen widespread transformation of back-office operations in manufacturing, some businesses have made early headway. Those who are looking to integrate AI now don't have to go in blind. This article explores lessons learned by experts who have already put automation in place.

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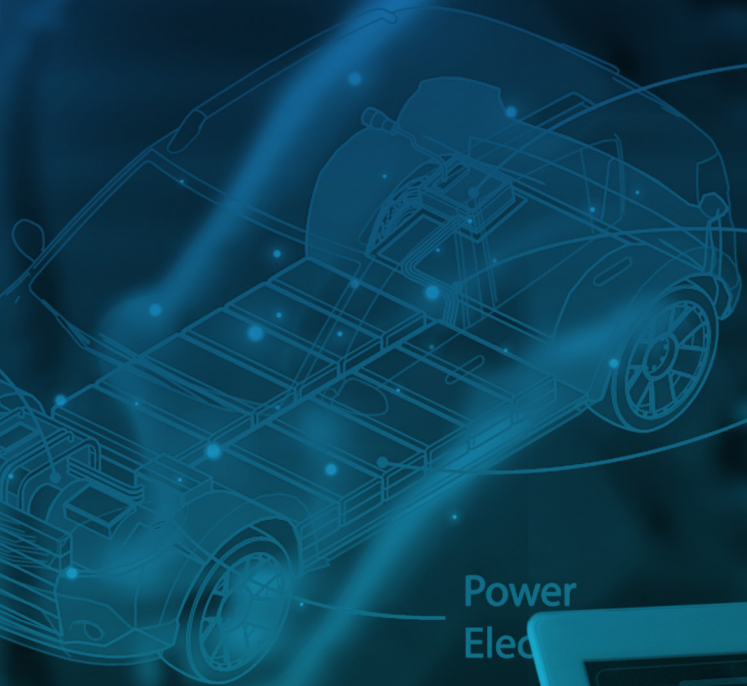
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# Lesson 1:

## Keep Humans in the Loop



In 2020, Michelin had already digitized large parts of factory operations and engineering, but administrative and knowledge work remained manual. Since then, Michelin has sought to augment its workforce with AI, without replacing workers. Following early experimentation in 2021, Michelin moved to building data foundations, and is now scaling AI. Now, there are now more than 200 business cases with carefully developed AI integrations. Ambica Rajagopal, group chief data and AI officer at Michelin, says she intentionally does not restrict the types of work processes that AI can be added to.

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for me, is empathy.”**

**Ambica Rajagopal,**  
group chief data and AI officer at Michelin

The company has an internal generative AI tool called Aurora. Built on top of that are knowledge agents, trained on documents and data from specific teams, such as finance and legal, so team members can easily generate first drafts of contracts or quickly cross reference invoices to calculate expenses. But individual employees can also create their own self-service agents.

“The key to adoption of AI, for me, is empathy,” says Rajagopal. For a company, AI adoption means better efficiency, she says, but often you’re essentially telling people to do their jobs in a new way. Taking that fact into consideration will help ease the transition by getting employee buy-in.

Michelin may offer suggestions for what workers can do with AI, like create a workspace or chat to knowledge agents to query large volumes of documents, but some Michelin employees have come up with use cases themselves, “without the help of IT”, says Rajagopal. One business services agent, for example, was created to compare information between documents in different formats. “We did not anticipate the amount of this kind of activity,” Rajagopal says.

Marcel Nattke, team leader of ecommerce at Harting, a global industrial manufacturer, saw similar enthusiasm, but at the opposite end of the AI adoption process. “I didn’t just go into my own private room and decide what the ideal AI solution was,” Nattke says. He asked teams to trial several



solutions, and ensured the key user of each team wasn't a manager—suddenly, lower level employees became their branch's tech liaison.

This kind of transparency was reflected in the technology as well, so staff quickly felt comfortable relying on it. Nattke's team chose Workist's order processing software for its built-in transparency. The system would tell users if it worked out a solution or not. Workist has a traffic light system to indicate when a human should be in the loop: Green indicates the system is confident enough to fully automate the process; yellow is medium certainty, flagged for human review; red is when it fails and reroutes to a person. It's a trust-building component that gives non-specialist tech users a glimpse into the black box, says Müller. It's really all about ensuring your employees have more agency than before. "For me, the project became successful when the first colleague reached out to me and said 'I feel that the system is lifting the weight off my shoulders; I have time to breathe again,'" says Nattke.

The same is true on the factory floor, Dungey explains, echoing Nattke's suggestion to involve employees early in the process. "If the engineers, operators, and supervisors do not trust the system it will not scale," he says. "It will be a quiet rejection." There needs to be buy-in across the whole environment—"shop floor to top floor"—with upskilling and training to ensure these technologies don't end up in what Dungey calls the (already well-populated) "graveyard of tools". Putting this work in upfront will pay dividends later.

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"What I often witness is [that] once they understand it, they do more clever things with it because they really get where it works and where it might fall over," says Dungey. "Put the effort in at that level, and you'll see massive rewards start to come across your business, because it will start to cascade, to snowball from there."



**Lesson 2:**  
**Start Small**

In 2023, Harting's leadership announced it wanted to double turnover by 2030, with the same amount of staff. "Obviously, that meant we needed to dramatically improve our processing speed," Nattke says.

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**Marcel Nattke,**

team leader of e-commerce at Harting

The company identified that the most time-consuming part of the sales process happened as soon as a new order was placed. Someone on the sales team had to extract the data from it and manually key that into the internal ordering system. That was a clear time suck. Nattke brought in three different solutions to test before Workist was rolled out, but they either lacked transparency or had inconsistent processing speeds. Now, orders are four times faster than they were. The same sort of solution or approach could be used elsewhere in the business. "In the beginning, errors will happen, so start small, learn, and then grow," says Nattke. Don't be tempted to jump right in with the area or subsidiary that will bring in the highest volume, he says; start with a part of your business that's more "error resistant" to build trust in AI.

This advice is particularly sound if there's any reticence around AI in your workplace, whether that's due to cost or trust. Before attempting to code your own AI system from scratch, for example, it may be better to pick an off-the-shelf solution as a proof of concept. "Your first AI project really should work," says Müller. "You don't want to burn AI for your entire organization."

The path you choose to start with should still be aimed at a real problem. "Start with a business problem, not the technology," says Dungey, urging manufacturers to not get sucked in by hype. "The best gains come from modest, targeted interventions," he says, not moonshots. On the factory floor that might mean using AI to identify ways to reduce energy use, for example. Keep it simple, Dungey says, but you've also got to design for scale from the start.

Revolutionizing one process within your business, only to create a bottleneck somewhere else, isn't the goal. Neither is building a system that works perfectly in theory, but doesn't take into account the real-life messiness of the manufacturing world. While white-collar workers don't have to consider how sunlight might impact AI-assisted weld inspections, it's still essential to consider how your first test case will slot into the bigger picture. If the project can't scale then it'll get trapped in "pilot purgatory", says Dungey, so even if you're starting small, you should be thinking big from day one.

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When manufacturers do start bringing AI into their organizations, Rajagopal's biggest learning centres on her 80/20 rule. She thinks 80 percent of the value is going to come from AI modeling processes specific to your company, and 20 percent is going to come from general productivity tasks. "The one advice I would give is to invest in both."



The background is a vibrant, futuristic digital tunnel. It features a perspective view of a long, narrow corridor. The walls and floor are composed of numerous glowing blue lines and dots, creating a sense of depth and movement. The lines converge towards a bright blue light at the end of the tunnel. The overall color palette is dominated by various shades of blue and cyan, with some white highlights from the glowing elements. The texture is highly detailed, resembling a complex network or data stream.

**Lesson 3:**  
**Don't Underestimate Data Preparedness**

There are myriad ways for manufacturers to add AI into their processes. Siemens has built an internal HR agent to provide employees with 24/7 support; Mercer uses Gemini to translate documents into safety videos; and Michelin has integrated AI into its supply chain to predict inventory demand, quality inspection to identify defects, and external customer service chatbots to answer customer queries.

“None of this would have been possible if we had not put in a great deal of less glamorous effort on the data side,” says Rajagopal. If companies do not have properly labeled and organized data, the AI systems they integrate will not work. Crucially, you can use AI to help with the organization: ask an LLM to wrangle it for you (start with a small portion), and then build in good future practices.

Michelin has assigned “data owners” to each segment of its business, and over the last four years they have become highly strategic roles. Instead of simply overseeing the data, these owners learned who needed what data when, and ensured it was always accessible, clean, and consistent. “If you don’t give the right level of strategic importance to the data governance in your enterprise, you will see the outcome of it in the rate of acceleration in AI adoption and agentification,” Rajagopal says. If you continue to advance without a good database, she adds, you’re going to expose more and more cracks in your data layer, and it’s not going to be pretty.

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On the factory floor, data management has even more layers of complexity—from connecting physical sensors to machinery to adding metadata to inspection imagery—which, perhaps, is why Dungey is under no illusions that “perfect data” is impossible. “It doesn’t have to be perfect, but you have to have enough trust in it for the decision you’re trying to improve,” he says. It has to be relevant, reliable, cover the span of the process and be governed properly—and, unless you’re starting from scratch, that means poring over the data you already have.





It's especially important to have a wealth of data in blurrier areas, where it's not immediately obvious something has gone right or wrong. "The edge cases are really important because that's where it stumps you," says Dungey. If an AI can identify the situations in which it's more at risk of making a mistake—when something's not perfect, but it's not clear why—then it can defer to a human supervisor.

Even when bringing in external AI products, such as Workist, having a clean dataset to feed it is essential. Nattke explains that the reason the product has worked so well for Harting is because it is imbued with the manufacturer's data. "You need to take the time in the beginning to train the system properly," he says. "If you think, 'Oh, yeah. It's AI. It knows everything. It'll do it right'—it won't."

AI may seem like magic, but it isn't. Data preparedness is a non-negotiable part of AI adoption: The data Workist takes from its clients will ground the system and keep it from making mistakes. If you haven't invested in IT for ten or 20 years, AI will not fix it, says Müller. "Clean up your master data!"



Bridging the gap between unstructured communication and structured ERP systems, Workist transforms how sales teams handle incoming orders. Its specialized AI agents automatically extract and validate document data directly from email inboxes, effectively eliminating the bottleneck of manual entry. By automating these repetitive tasks, Workist empowers companies to dramatically accelerate workflows, minimize human error, and free their teams to focus on strategic growth.

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