



Productivity and beyond

The application of AI in industry promises to support more flexible, responsive manufacturing

With its long track record in industrial automation, the manufacturing sector has already laid significant groundwork when it comes to adopting artificial intelligence (AI). Modern factories are awash with sensors and collect vast amounts of data, from the factory floor to the supply chain. Those preparations could pay dividends in the years ahead, as companies seek to tackle a range of looming fundamental business-model changes: from demand for more complex and customized products to new service-based propositions. AI will be a vital tool in helping manufacturers become more flexible and responsive in the face of these changes.

A recent cross-industry survey, conducted by The Economist Intelligence Unit and sponsored by Microsoft, finds that the manufacturing sector is significantly ahead of other industries in applying AI. Respondents from this sector are the least likely to report a lack of awareness of use cases for the technology, and more than three-quarters (78%) say that their organizations have explored such use cases “somewhat” or “a great deal”, compared with a cross-survey average of 68%.

A wealth of data

The enormous amounts of data that stream from connected equipment, much of it in real time, can provide manufacturers with valuable insights into conditions on the factory floor—and this is where the earliest applications of AI are seen. When asked about the first use cases in which AI will become relevant to their sector, close to three in ten (28%) manufacturing respondents cite predictive analytics, in areas such as demand and inventory forecasting and using AI to predict malfunctions and therefore extend the useful life of equipment.

A similar number (26%), meanwhile, point to its use in real-time operations management. In a manufacturing environment this typically refers to production processes under way on the factory floor or in the supply chain. In other words, AI could help them to quickly spot any anomalies that could delay the delivery of products. A piece of machinery could break down, for example, or a delivery truck might hit traffic congestion.

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It makes sense that these would be the earliest use cases, says Marco del Seta, head of digital at BOC UK & Ireland, a supplier of gases to the industrial, food and beverage, and healthcare sectors, because they are quite clearly designed to tackle manufacturers' biggest headaches. "Predictive maintenance via AI, in particular, is quite developed now as an approach, and it certainly gets the most attention, but that's for the very good reason that, for any manufacturing business, any unexpected breakdown is a costly business," he says.

Business model evolution

But this focus on improving the productivity of existing assets is just scratching the surface of AI's potential in manufacturing, according to Bob Parker, group vice-president of research at analyst firm IDC. In future, he says, manufacturers will start to look beyond simply productivity gains to using AI to support new business models.

Such changes weigh heavily on the minds of many manufacturing bosses. In the survey, they show above-average concern for business-model sustainability, with 16% citing it as one of the top two strategic challenges facing their business.

Take, for example, the rise of smart, connected products: manufacturers are increasingly creating new products—from cars and fridges to industrial equipment—that transmit data back to their makers.

This allows a manufacturer to know about a product's usage, when it might require maintenance or is running low on consumables such as printing ink or detergent. AI will be key to evaluating the insights that flood in from smart products, opening up opportunities to launch new add-on products and services. It also offers new business models, based on "renting" the machine to the customer on a subscription or pay-per-use basis rather than an upfront purchase price.

At some companies, this shift to "servitization" is already under way. Rolls-Royce, for example, charges customers of its jet engines based on flying hours. Sellers of industrial machinery, meanwhile, might charge customers on the basis of factory-floor outcomes: the number of components made, for example.

AI can also help meet rising customer demand for more differentiated, customized products, says Mr Parker of IDC. That's a big challenge for traditional manufacturing, says Mr Parker, where factories have typically been optimized to produce a small range of products in high volumes as rapidly and cost-effectively as possible. Now, the machinery in factories will need to be flexibly reassigned to carry out different tasks to meet a wider variety of demand.

To do this, manufacturers will rely on the application of AI to a wide range of demand data—not just on sales, but also on socioeconomic trends and weather patterns, among others—to anticipate what customers will require. This will help them plan for new complexities and adjust course, by, for instance, reconfiguring existing manufacturing cells (individual areas on the factory floor where particular tasks are carried out) to handle incoming orders for a specific design. AI will be a valuable weapon when a manufacturer needs to optimize staffing, energy consumption or the supply of raw materials.

Adapting to change

Emerging technologies are already doing much to make manufacturing environments more adaptable to change, says Mr Parker at IDC. Today's industrial robots, for example, cannot only multitask better than ever before, thanks to AI capabilities that help them to "learn" new jobs, but are also cheaper, making them more accessible to smaller manufacturers.

A particular case in point is the emergence of the highly adaptable collaborative robot, or “cobot”, designed to safely work side-by-side with human colleagues. This trend is seeing robotics enter new areas of the factory floor that were previously the sole domain of human workers.

The manufacturing sector is by far the most enthusiastic adopter of robotics and will continue to be so, according to the survey. Looking ahead five years, more than a third (36%) of manufacturing respondents expect to have increased their use of robotics.

No loss of jobs?

A growing population of robots has led to widespread concern over the loss or devaluation of manufacturing jobs as a result of automation. Despite recognizing these concerns, respondents in the manufacturing sector are notably optimistic about the benefits of AI for both workers and companies compared with their peers from other industries.

AI, they say, will slightly or significantly increase the availability of new jobs (57%), increase wages (73%); and increase worker productivity (85%). Indeed, it is also true that the adoption of AI and advanced robots allows manufacturers to shift human workers away from dirty, dangerous or monotonous tasks and redeploy them on more valuable, human work that makes the most of their skills and experience.

However, many will be required to embark on a significant reskilling exercise along the way, says Mr Parker at IDC. “Manufacturing has traditionally been the domain of the skilled machinist, the craftsman, but it’s rapidly becoming the domain of the coder,” he says. “Where once a manufacturer would rely on a craftsman’s ability to set up a jig to accurately create a part, they’ll soon rely on coders who can program a robotic arm to set up that jig,” he says. Encouraging tech-savvy newcomers to the profession, with the ability to code and an understanding of AI, will be vital to bridging this skills gap and building the products of tomorrow.