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The Smart Factory Is Now

As a result of digitization, many everyday objects can collect data, analyze external information and communicate with each other. But what happens when this technology is applied to the factory—to large companies, as well as to small and medium-sized businesses? What elements will characterize the factory of the future?

Operators and manufacturing systems communicate with each other in real time via digitization, which at the same time provides enhanced intelligence that enables them to optimize the value chain and simplify processes. Smart factories will generate value using such technologies as wearable devices, exoskeletons, artificial intelligence (AI), machine learning and collaborative robots. Key benefits include increased productivity and reduced time-to-market, as well as the ability to remotely manage multiple tasks via the Internet of Things (IoT) and augmented reality.



The technology employed in the industrial world should always be considered as a useful tool to support people's activities, as it improves production efficiency and working conditions while protecting workers' health. This is the reason why a growing number of manufacturers are investing resources in the search for solutions to improve the ergonomics of all workstations—in particular, those characterized by physically stressful tasks. Among these companies is IVECO, which recently introduced Comau's MATE exoskeleton on one of the production lines at its plant in Brescia, Italy, to preserve the health of its employees while improving their comfort and, consequently, the quality of their work.

Moreover, aligned with the evolving industrial manufacturing sector, automation processes and robotics are being influenced to an increasing degree by AI and machine-learning technologies. Among the potential applications for machine learning, AI is being used to program robots to facilitate autonomous learning and optimized trajectories within complex manufacturing scenarios.

The use of AI and machine learning can increase the efficiency and optimization of the trajectory while significantly reducing programming time—for example, by creating a virtual simulation of all possible variables that must be considered. This information can then be analyzed and processed in order to identify optimal sequences, after which virtual programming can be passed to the physical authentication area and be quickly deployed.

Considering that robots can learn how their trajectories coincide with the other equipment, the system can proactively signal any conflicts or deviations from the optimal path. One more important element is that any changes in the product or process can be easily re-executed through the virtual environment in order to obtain the sequences required for the new product.

The benefits don't stop there, though. When building a dynamic framework of virtual simulation, it is important to know that the first step in creating a digital twin is being taken. The two environments become more aligned as the physical realm feeds information back to the virtual realm. This forms the basis for a virtually digitalized factory that perfectly mirrors the manufacturing lines, thus facilitating a shared intelligence across the entire operation that can further optimize complex processes and changing production scenarios.

Due to the need for increased integration and interaction across manufacturing lines and equipment, the ideal solution necessitates improved diagnostics that can predict and prevent faults and quality discrepancies. This is where digitization comes in. Industry 4.0 has a value-creation potential for manufacturers and suppliers of \$3.7 trillion in 2025, but only 30 percent of global companies are currently capturing value from Industry 4.0 solutions on a large scale. By exploiting the interconnectedness of IoT-enabling technologies, companies can use digitalization and analytics to provide 360-degree visibility over their entire operations.

In his role as Comau North America's head of digital platforms, Paolo Avagliano leads the company's digital platform team with the mission of transforming the traditional business-value proposition by enhancing Comau's digital offerings to answer new and emerging customers' needs. He also focuses on developing and managing strategic partnerships with innovative technology companies. Paolo joined Comau in 2014 as its head of global planning and was responsible for defining and deploying industrial operation strategy. He supported core business activities and developed strategic frameworks to integrate business strategies and processes companywide, then became the head of integrated supply chains.



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