

## CURRENT AFFAIRS AUTOMATION

## A rosy future for robots

**THE WORLD OF ROBOTICS AND ALL ITS APPLICATIONS IS IN A PERIOD OF GREAT EXCITEMENT AND DEVELOPMENT IN ITALY. THIS IS EVIDENT FROM THE DATA PROVIDED BY SIRI - ASSOCIAZIONE ITALIANA DI ROBOTICA E AUTOMAZIONE, THE ITALIAN ASSOCIATION OF ROBOTICS AND AUTOMATION SYSTEMS, AND UCIMU - SISTEMI PER PRODURRE. ITALY HAS A SOLID POSITION IN THE WORLD.**



**by Ezio Zibetti** - "If every tool, when ordered, or even of its own accord, could do the work that befits it... then there would be no need either of apprentices for the master workers or of slaves for the lords."

It's 322 BC and Aristotle is talking. Robotics, then, have very distant origins, although for a serious commitment and for their first actual realization we need to wait until 1961 for the Unimate robot and four years later, in 1965, with the measuring robot from DEA. Since then, the world of robotics has, each year, made gigantic leaps forward in different parts of the world and also in Italy where in 1975, SIRI, the Italian association of robotics and automation systems, was established, still an authority and reference point in Italy for researchers, manufacturers, users, and system integrators. Together with Ucima-Sistemi per Produrre, SIRI has recently presented market data on robotics in Italy and around the world.

## Robotics in Italy

The Italian market data was presented by Stefania Pigozzi manager for the Centre of Studies and Corporate Culture, Ucima-Sistemi per Produrre.

The data are the result of a study involving 24 companies from the Italian robotics industry.

An initial analysis of the data shows that between 2008 and 2020, production in Italy fell slightly from 2,864 units to 2,082, while imports of robots grew significantly over the period, from 2,709 units in 2008 to 6,791 units in 2020, the latter, moreover, down by more than 20% compared to 2019 because of the pandemic. Italian production of robots targets exports. In fact, as many as 52.4% of robots produced in Italy are destined for applications in various countries around the world.

"Consumption data is also interesting," Stefania Pigozzi explains, "having risen significantly from 4,556 units in 2008 to 7,782 in 2020, the latter figure down compared to 2019. Overall, consumption of robots recorded a 14.2% decline compared to 2019; 87.3% of demand was met by foreign manufacturers, who saw their sales fall by 14.7%."

Articulated robots dominated the sales in most areas, in the manufacturing industry, in exports, and also in imports and in the consumer market.

To be precise, demand for articulated robots went from 7,333 units in 2019 to 6,204 in 2020, a decline of 15.4%. Even demand for Cartesian coordinate robots saw a decrease in 2020 of 24.3%, falling from 494 robots to 374.

"In regards to the fields of application," Stefania Pigozzi under-

scored, "handling is still comfortably in first place with 73.8% of applications in 2020, a figure up slightly since 2019 (73.3%). Welding is the next category with 10.3%, a decline since 2019 (12%). In handling tasks, articulated robots are the most commonly used with 82.5% of all installations. In 2019, nearly 1,100 units were used for welding, including the applications of arc and spot welding, figures that saw a decline in 2020 to 802 installed units. In the field of assembly," Pigozzi continued, "the figures are, instead, confirmed with a decrease in 2020 of just 19 units (710) compared to the 729 of 2019."

Positive and encouraging are the provisional data for 2021 which is seeing a rise in the number of robots installed in Italy of 21.5% nearing 9,500 units, a value that is reflecting how the market is recovering after the decline caused by the pandemic.

## Robotics around the world

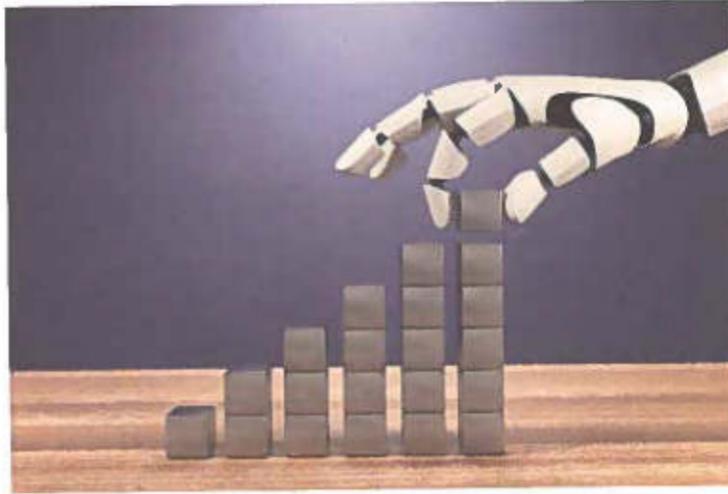
The stage then went to Alessandro Santamaria, Executive Board Member for the International Federation of Robotics (IFR) who spoke about the robot market globally.

It should be noted that the data refers to 2019 as the 2020 results are still being processed and will be released during the autumn.

Already in 2019, the robotics industry around the world recorded a decline that had been expected after years of significant growth: 373,000 units (without software and peripherals) shipped in 2019 with a decrease of 17% compared to the previous year. It is worth noting that between 2014 and 2019, average annual growth was 11% with a prevalence in handling which accounted for as much as 46% of installations, followed by welding with 20%, while on the application side, the auto industry saw the largest share of the robotics market with 28% of installations, followed by the electric and electronic industry with 24% and the metalworking industry, seeing 12% of robots installed.

"If we then look at the geographical areas," Santamaria said, "Asia is the undisputed leader followed quite far behind by Europe and America. Specifically, in 2019, 245,000 robots were installed in Asian countries compared to 72,000 units installed in Europe and 48,000 in America. In this context," Santamaria continued, "Italy has improved its position rising from seventh position in 2018 to sixth in 2019 with 11.1% of total installations in the year."

And even in regards to the population of industrial robots installed in the world until 2019, numbering 2,722,000 units, Italy is in sixth



place with 74,400 units installed ahead of countries like France and Spain.

However, Italy falls to tenth place when we talk about the density rate of robots with 212 robots per 10,000 employees, which is, though, higher than the global density average of 113 robots per 10,000 employees.

Continuing with the comparison with other industrialized countries, because of the robots sold in 2019, Italy holds a solid position on various sectors. It is twelfth in the automotive sector, but fifth in the chemical industry, fourth in non-conventional sectors and third in the food industry.

If the comparison is made by type of application, we note that Italy is sixth in general handling and in third place in the specific areas of machine tools and palletisation, and fifth in assembly and non-conventional applications. It rises, however, to tenth place in welding applications.

Of note, compared to other European countries, 2019 data puts Italy in fifth place "in the automotive sector" with 1,258 robots delivered compared to more than 10,000 in Germany. Germany is in first place in Europe also for the number of robots sold in general industry (10,247), but Italy is in second place in this segment, with Germany trailing closely behind it with 9,831 robots sold in 2019.

In the world of robotics, sales of collaborative robots have also been a growing trend over the past three years. In fact, in 2017 they accounted for 3% of the units sold but the figure rose in 2019 to 5%, a value of approximately 18,000 units sold.

A great application development globally is being seen in service robots. We talked about this with Rezia Molino, a past president of SIRI.

It is important to note that service robots include all uses that do not pertain to industrial applications, which have a specific design linked to the application, and normally are three-axis robots

and not always autonomous, but rather controlled remotely. The market for these robots is very diverse and therefore characterized by different customers, prices, distribution channels, and suppliers.

## Robots and work

Robots have always been considered a "competitor" to employment, because they take away the need for labour in many applications. Certainly, this is the case in many applications, especially those hardest for human workers, but in turn, the world of robotics has created new, more skilled jobs.

Presenting data in this regard is Domenico Appendino, president of SIRI.

"In 2008, approximately one million robots were operating, and thanks to their installation, between 8 and 10 million jobs were created. If we take that figure and apply it to today's world, the roughly three million robots currently in operation will have created between 20 and 25 million jobs around the world."

"What's more," Appendino continues, "according to some recent studies, robotics have a positive impact on employment. In fact, they reduce production costs and as a consequence reduce the cost of the individual products. The reduction of product costs increases demand and in turn also increases the demand for jobs. It is truly a virtuous circle."

Again, according to recent studies, robots increase competitiveness between companies and have created an increase in wages while reducing the number of hours worked (Georg Graetz and Guy Michaels for the Centre for Economic Performance at the London School of Economics). Moreover, countries that have invested the most in robots have lost fewer jobs than those who did not make such investments (Robots Seem to Be Improving Productivity, Not Costing Jobs." Harvard Business Review 2016). Domenico Appendino then pre-

sented some figures that specifically regard Italy.

"According to recent data from SIRI's Study and Statistics Centre, the increase in robot installations from 2014 to 2018, rising from 60,000 units to more than 70,000, corresponds to a reduction in unemployment of about 3%."

But what are the challenges that await the world of robots for the near future? Answering that question is the president of SIRI.

"First of all, robots kill lower skilled, repetitive, hazardous jobs that pose a threat to health. In other words, the jobs people no longer want to do. Robots create other jobs, most of them higher skilled and therefore with higher pay, and jobs that people want to do. As a result, the primary challenge is investment and training."

"According to forecasts by the World Economic Forum in 2018," Appendino continued, "in 2025, half of all current jobs will be done by robots with a loss of 75 million jobs, while again in 2025, thanks to automation and robotization of the lost jobs, another 133 million jobs will be created, with different, more highly skilled tasks. The positive balance will therefore be 58 million of new, more highly skilled and qualified jobs for people. All this will happen if countries and companies are willing to train workers."

The second challenge will be determined by the role of artificial intelligence that represents the driving force of technological evolution, and new software is the main protagonist. Artificial intelligence will be integrated into physical robots, but many tasks will be automated through software applications performed on computers (bots). The regulation of artificial intelligence generally and the so-called "super intelligent" robots is absolutely necessary, not only taking into account concerns regarding the potential impact of new technologies, but also considering the proven advantages that these technologies are bringing to the industry. Here arises another challenge," Appendino says, "that of new regulations. At the request of the European Parliament, the EU Commission presented new guidelines on 24 April 2021 setting out the ethical principles of artificial intelligence, robotics and correlated technology, including software, algorithms and data. Future laws must be based on the principle of anthropocentric and anthropogenic artificial intelligence. High risk technology like self-learning capabilities must be designed in such a way that human surveillance is permitted at all times. If a function is used that could result in a serious violation of the ethical principles and that poses a danger, the ability of self-learning must be disabled and full human control must be restored."

People, therefore, must remain, and they must remain at the centre, and robots will certainly not be 'colleagues', but simply useful tools for people's labour," the president of SIRI concluded.