

Robotics, a growing sector (despite the crisis)

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Robotics in the world

The industrial robotics sector continues to grow. Data from the International Federation of Robotics' World Robotics Report 2019, the latest available data providing the picture for 2018, are positive. They are not as extraordinary as those of the previous year, but we must not forget that total installed robot (the robots actually installed in the year) increased by 15 % and consumption that has increased only by 6 % are not to be ignored after an average growth in the last six years of 13 % of installed and 19 % of consumption.

We know that investment goods are always cyclical, with moments of growth and stagnation. Production tools, such as machine tools and robots, are the derivative of consumption which, in economically critical periods, shows more significant decline indices than other sectors. Robotics, however, even in these years of crisis, has experienced greater growth than other sectors of the manufacturing industry and this is to the advantage of this sector that presents a new youth.

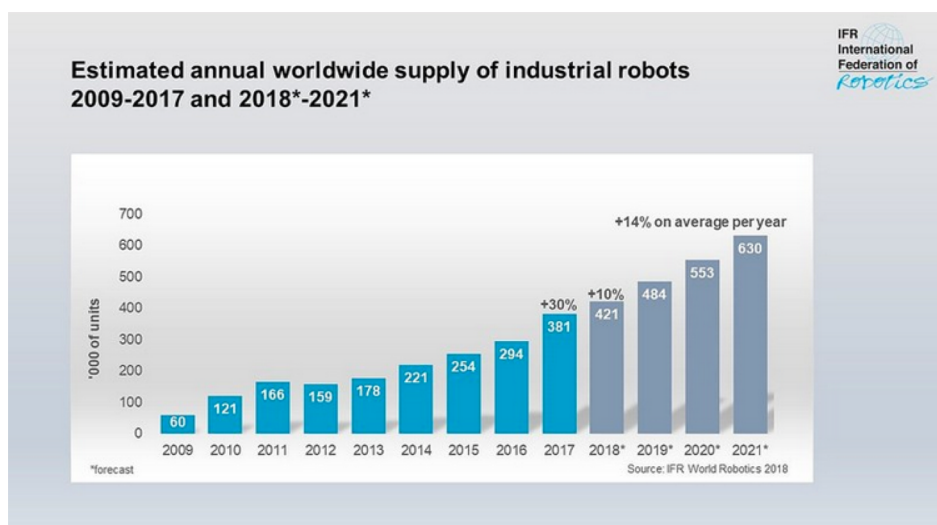


Fig. 1 Global sales of industrial robots more than doubled from 2013 to 2017 (14%) and forecasts for this year and the next three years (2018-2021) estimate that global sales will increase on average by 14% per year.

It is interesting to note that while in the 2000s industrial robotics was a market I called mature because it has shown growth rates for more than a decade similar to other capital goods, we have then pleasantly witnessed its double-digit growth. This year's slowdown was mainly due to Asia, the main driving force behind this development, which grew by only 1 % in 2018, with China marking its first step after two decades of staggering growth.

The world economy is also going through a difficult period, but China in particular is looking for more sustainable development, as defined in the new multi-year plan of the President of the People's Republic of China, Xi Jinping, and today any change in Chinese economic trends has an important effect on the world economy. In fact, 36% of the world consumption of robots in 2018 was in this country.

The industrial robotics in the world can be summarized in the following macro data: in Asia there is 60% of the installed, in Europe 22 % and in the Americas around 15%. Consumption is 67% in Asia, 18% in Europe and slightly more than 10% in the Americas. This last figure also gives an indication of the future of the market; in fact, sales is a punctual figure, characteristic of a specific year, while the installed figure is an integral figure that sums up the results of the history of this sector from its origins. Sales can therefore be read as a derivative of the market and Asia, despite this particular year, is still growing slightly and continues this year to show an absolute record.

Unlike what is present in the collective imagination, influenced by literature and science fiction films, the number of industrial robots installed in the world has a total of two and a half million units installed. In 2018 four hundred thousand robots were sold, the sixth consecutive year of absolute annual record in the world with a significant average growth in sales that, as already mentioned, in the last six years corresponds to 19 %. An important market trend: IFR forecasts that four million robots will be installed in 2022.

Robotics in Italy

As for the robot market in Italy, remember that Italy has historically been and is a very important country for robotics: three different types of robot were invented in Italy (measuring robots, mounting robots, laser robots) thanks to enlightened men and innovative companies. Subsequently, companies were developed in Italy that produced robotic systems with significant capabilities for integration, design and use of robots in new applications. These are the so-called integrators, companies that design and sell plants in which the value of the robots present is often only a small part of the total value.

In Italy we have two important companies producing robots, one of medium size, Prima Industrie, a well-known protagonist in the history of Italian robotics, which produces laser robots and COMAU, larger, which is not only a manufacturer of multifunction robots but also realizes large plants. In 2018 Italy sold about 10,000 robots, which brings our country to seventh place in the world for sales, sixth place for installed and ninth place in the world for the number of robots for 10,000 employees, a value that indicates the density of robots in the country.

In the past Italy had better positions but had to leave to some Asian countries emerged, China and Korea, not because the absolute value of consumption has decreased in Italy but because in these countries after 2000 consumption has grown significantly more.

However, if we consider the Italian growth in consumption compared to the world, in 2018 there was an increase of 27% compared to 2017, the year in which it had already shown an increase of 20% compared to 2016. Again referring to world consumption data, Italy grew 4.5 times the world average, twice as much as Europe and North America. Even in terms of value, in recent years Italy has again shown remarkable data, despite the economic crisis, presenting each time an absolute record.

The outlet sectors of Italian robotics are a bit different from the international ones, where the automotive sector remains the driving one. The automotive sector, the most important for robotics in the world, for the well-known reasons in Italy has been significantly reduced in recent years for which has drastically decreased its demand for robots, but fortunately have developed.

Dr. Domenico Appendino

Born in 1951, nuclear engineer (1974) and specialized (1976) at the Polytechnic of Turin, where he worked until 1976 in various research and teaching activities, before moving on to the industrial sector.

From 1995 to 2010, he was the marketing director of PRIMA INDUSTRIE and from 1999 to 2010 he was the Group's corporate director for the establishment and development of companies in Asia, of which he was chairman, vice-chairman or director. Since 2011, he has been Executive Vice President of the Parent Company, with a mandate for special projects (management of subsidiaries, establishment of Prima Power Suzhou in China, design and construction of new group offices). Chairman of SIRI, UCIMU director and ManuFuture Italia chairman, since 1976 he has been collaborating with important bodies and universities in research programmes, courses, conferences and is the author of about one hundred articles and publications.



The cobots

For some years now, the famous cobots, or collaborative robots, have been introduced into the industry, even small and medium sized ones. These robots have the great advantage of being able to work with and close to the human operator, thus constituting a safer, smarter and more flexible tool, thanks to the development of sensors and control systems, often controlled by smartphone or tablet.

Compared to robots closed in cages, which can work at high speed and with high productivity but with less flexibility, the cobots are certainly less fast, but have all the advantages of an automatic and safe tool that can be close to man and with man. The traditional industrial robot, to develop its high productivity and work at speed, had been isolated in the cells or installed in protected lines, often transforming the production method and therefore requiring large investments and a radical redefinition of the factory production organization.

In reality, the cobot is the robot that we wanted from the beginning but that for various reasons could not be there immediately, requiring a period of appropriate development to reach the current level of technology and cost. The cobot has in fact a lower cost, is relatively easy to program, enters even in small and medium industry and occupies the space that was previously unthinkable to make robots occupy. Cobots also reduce the difference between industrial robots and service robots.

The famous and now often abused 4.0, an industry integrated with networks and the cloud, is transforming the concept of company allowing it to overcome the state of individual and isolated reality and thanks to networks will also allow small and medium companies to play an important and competitive role in which the cobots will have a central part.

In numbers, the consumption of cobots is still limited but is growing and it is estimated that today it is worth around 4 or 5% of annual sales. The data of this market are not surveyed but only estimated because companies that produce cobots in this still pioneering phase of the product do not like to compile statistics considering this consumption a sensitive data that they prefer not to disclose. However, it is clear that in recent years there has been a very significant growth in the number of cobots, estimated at a value in the order of 50 % per year, a very high value and comparable to that of service robotics.

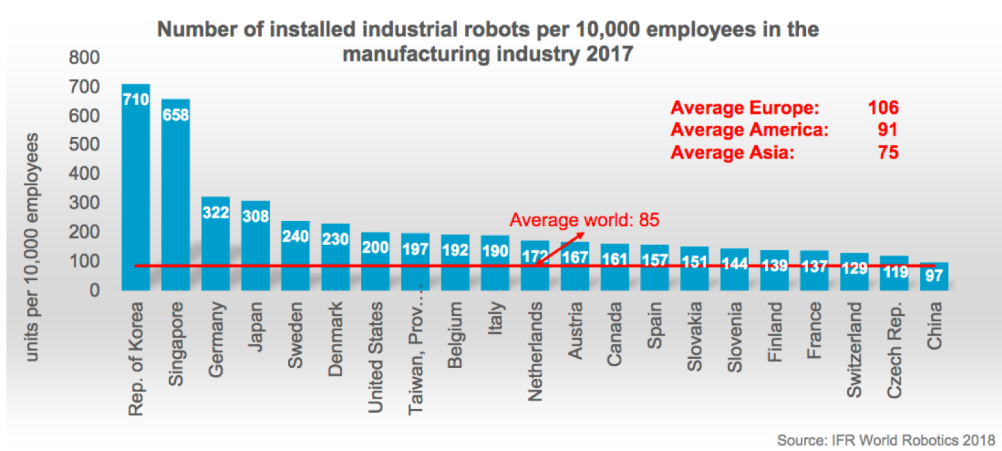


Fig. 2 Number of robots installed in 2017 in the manufacturing sector per 10 thousand employees. Italy is in a central position.

SIRI, the Italian Association of Robotics and Automation (<http://www.robosiri.it/>), a non-profit cultural association founded in 1975, is intended to be a reference for those who feel the need to explore issues related to robotics and its applications.

SIRI's members include research bodies, universities, manufacturers, integrators and importers operating in the robotics and automation sectors. This allows to promote the connection and exchange of ideas and information between research, industry and users.

SIRI works in close collaboration with PubliTec and UCIMU- SISTEMI PER PRODURRE (Association of Italian Machine Tool, Robot and Automation Manufacturers).

SIRI is a member of IFR (International Federation of Robotics), a body that connects the Robotics Associations of the most industrialized countries.



Ethical, legal and societal aspects of advanced robotics

Every year SIRI organizes conferences focused not only on technical aspects but also on social or ethical aspects of robotics, considering them all equally very important. Among others, we have recently addressed topics such as "robots and work" and "robots and health". As far as the theme of work is concerned, it is often the robot that is the first to be accused, when in reality we know that bots, i.e. non-physical robots, have been responsible for similar problems for many years and in a more massive way and that if it is true that automation kills jobs, in reality it creates others, in greater numbers, better and more remunerated.

Industrial automation and robotics have not only been developed to increase the profits of industrialists or to make companies more competitive, but also to improve the working conditions of humans, their development and growth has therefore an unstoppable push.

I always like to remember that the first industrial robot in the world, Unimate by Engelberger, was designed and introduced in 1961 in the United States of America also to reduce the fatigue and danger of workers who unloaded the heavy hot engine bases into production lines in the automotive industry and in its second application was used to prevent humans from blinding while welding in dangerous conditions.

As already mentioned, most of the known studies, some even from the IFR, show that robots, automation in general and recently also artificial intelligence applied to production improve working conditions. It's also true that they reduce jobs, but they create others in a decidedly important number that are more suitable for humans, as they require more intelligence and are better paid. This is where the big problem of training employees comes in, a crucial issue that needs to be addressed and managed so that the balance of jobs created and lost can be positively certain.

Today the speed of change in work processes is truly impressive: while once what was studied at school could serve on the job, today the great wealth that the school must give is a method of learning and training, in other words "teach to learn". In fact, it is increasingly necessary for everyone to have a permanent education, to know how to solve the problems that arise with method and a critical spirit. I deeply agree with the concept of "culture is what we have left when we have forgotten everything" and I believe that this should be the objective of true training.

Proposals have been made at European level to tax robots to compensate for alleged job losses. There is nothing more wrong than taxing income, not how it is achieved. Rather, the states must take care to encourage adequate training: it is necessary to facilitate the ongoing automation process, i.e. the transformation of the worker into an operator. This is an unstoppable process because it aims to improve working conditions and therefore human life, not only to improve the profit of companies that, with appropriate training that gives people the necessary skills, will make possible a clear transformation and an increase in jobs.

In recent discussions on the ethical aspects of robots, attention has rightly been paid to the many problems raised by the applications of artificial intelligence. One wonders what the artificial intelligence of machines will be like in ten years' time. I hope that we will find it in the service of man, not against him. In this theme is great the responsibility of states that must enact enlightened laws with man always at the center: everything makes sense if thought, designed and built for man, just as in the first half of the last century was indicated by Asimov with his three famous laws of robotics in his works of science fiction. At the very least, if you were to run a risk for humanity, I believe that the self-destruction of this automation, abnormal and extremely dangerous, should be done automatically with an extreme but necessary rule. The humanism of technology, this is what we must strive for.

Where robotics will go will therefore depend heavily on political decisions (the company must produce income and work, the state must regulate its behavior from an ethical point of view) and hence the importance of the values of European culture. Asia has a different culture from ours, this could raise concerns because it is now the first market for robotics, but fortunately Europe is working on standards that will show the artificial intelligence paths and objectives in order to determine the areas and limits of applications with a strong anthropocentric tendency.

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