



# Robotics and automation outperform, backed by "Industry 4.0"

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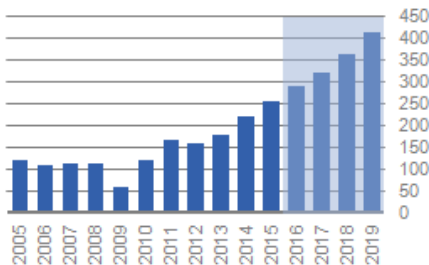
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## Annual supply of industrial robots is increasing worldwide

Supply in 1000\*



\* As of 2016 forecast

Sources: International Federation of Robotics, VDMA

The German mechanical engineering sector recently tripled its growth forecast for 2017, from 1% to 3% (both in real terms). Robotics and automation is an important growth driver; this sub-segment is likely to increase output by 7%, i.e. double the rate of the segment as a whole. The mega issue "Industry 4.0" plays a key role for this development. As this trend is gaining importance both in Germany and around the world, the medium-term outlook for the sub-segment remains excellent as well.

The fourth industrial revolution, also nicknamed "Industry 4.0", is probably one of the most important topics of this decade across all industrial sectors, from mechanical engineering to carmaking. Ultimately, the "Industry 4.0" aims to create a smooth and perfect symbiosis between traditional, established industrial production procedures and the latest digital information and communication technologies. Companies which (try to) escape the trend towards digital networks and the optimisation of value-creation chains are in danger of losing competitiveness and market relevance in the near future.

There is more and more evidence to suggest that factories will be almost fully automated and robotised in the future. The aim is a "smart factory" which will intelligently combine different approaches and become a highly efficient manufacturing location, with machines at different production stages and logistics systems that permanently exchange information, (re-)organise and improve themselves – and all that without much human interference. If this vision is to become reality and if industrial production is to become considerably more efficient, we will need to see further technological innovations.

Technological progress is visible at many levels even today. Modern production plants are highly flexible. Flexible automation solutions enable tailor-made production, which helps to meet the ever more sophisticated client and consumer needs. "Mass customisation" is one of the key goals of the "Industry 4.0" and is no longer in its infancy in many different sectors, including textiles, shoes, furniture, clocks or jewellery. Production efficiency is also increased by component management networks. And in addition, modern industrial production outfits utilise up-to-date image processing systems for quality management purposes.

Digitalisation, automation and robotisation also affect people's working lives and are fundamentally changing the workplace. On the one hand, technological progress will certainly help to make many simple, repetitive and often highly



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strenuous production steps superfluous. On the other, stabilising or even increasing competitiveness will require ever more efficient production procedures. In the end, Germany, a highly industrialised country, relies for its export success on a clear commitment to modern production procedures, product innovation and cost efficiency.

In the era of "Industry 4.0", we will need to rethink the relationships between workers and robots to create a win-win situation. What is key is that humans and machines work together as a team and interact more closely. Industrial robots work with unrivalled steadiness, precision, speed and – thanks to modern image processing – at an error rate of zero, which is impossible for humans. Thus, robots are really perfect assistants. However, it is still humans who need to pull the strings. Humans are creative and flexible and able to gauge complex and critical situations accurately.

What is sometimes overlooked is that humans can rely on intrinsic knowledge, which is (yet) out of reach for robots. This intrinsic human knowledge is ultimately at the bottom of market-relevant values such as aesthetics, fashion or taste. Personal criteria doubtlessly play a key role in many consumer decisions, from the purchase of a car to that of a new dress, and thus shape the market success of many industrial goods.

Until a short time ago, many young, ambitious and creative people thought that industry jobs were profoundly uninteresting. Unsurprisingly, many mechanical engineering companies worried about their attractiveness for students and qualified workers. However, the "Industry 4.0" and the ever more sophisticated requirements for a successful collaboration between humans and robots will change this and probably reverse the trend. In fact, the interaction between humans and robots and its optimisation will require particularly creative individuals who are open to unorthodox approaches and believe that this will provide them with new chances for development. This means that the numerous German medium-sized companies which form the backbone of the domestic mechanical engineering sector should become particularly attractive for people who are interested in technology. It is often small and medium-sized companies which adopt new products and new production procedures early on. If medium-sized companies come to rely more and more on human-robot collaboration solutions in the future, they will probably be able to create new jobs thanks to their success on both the domestic and foreign markets. Even today, the German mechanical engineering sector with its many small and medium-sized companies employs more people than at any time since the German unification, despite numerous technological challenges in the last few decades.

We believe that digitalisation and "industry 4.0" will remain important issues on the agenda for all domestic and foreign industrial sectors. In particular, producers of robots and automation solutions will benefit from the necessary modernisation investments. This means that, in the period up to 2025, robotics and automation will probably continue to register double the growth rates of mechanical engineering as a whole, like in the current year. We forecast an average growth rate (including weaker years) of 1 – 2% p.a. for mechanical engineering as a whole.



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