

Quality engineers - conductors of modern production

Quality Engineering focuses on the management, creation and operation of highly networked production and business processes. High specialization and interdisciplinary thinking are required.

➤ **Industry Innovation**

Efficient production processes require quality engineering

The situation with quality engineers is similar to the situation with conductors in a philharmonic orchestra. There are indeed virtuosos of instrumental mastery. But to ensure that wind instruments, strings and percussionists harmonize well with each other and that there are no discordant notes, someone stands in front of the orchestra pit and uses the baton to ensure that the individual sections fit exactly and that everything harmonizes with each other - for perfect musical enjoyment.

For perfectly trimmed and coordinated smooth production processes, quality engineers are usually the conductors. At first glance, the term quality engineering seems rather vague. Wikipedia, for example, defines it exclusively as bound to the IT architectures and uses terms such as management, creation and operation to explain the tasks. This may not be wrong in principle, but it skips too short - and already the term management in connection with quality shows that quality engineering is used today as a broader generic term. This does not even have to be uniform.

Quality engineering instead of quality management and assurance?

Various training providers, for example, combine it with the term service in seminars, offer Quality Engineering in Mechanical Engineering as a part-time course of studies with a Master of Science degree and the title "DGQ Manager Quality Assurance" (DGQ stands for the [German Society for Quality](#)), or offer predominantly IT-heavy topics as bachelor theses. This shows how diverse and broad the term is.

Experts such as Dr. Benedikt Sommerhoff from the DGQ put Quality Engineering in context with the term [Industry 4.0](#), in which it is understood as a generic term for quality management and quality assurance that has been in use for some time. With the reference to assign the area of

organizational development to QM (quality management) and to define QA (quality assurance) as a pure high-tech task. Well then? If one detach oneself from buzzwords such as Industry 4.0 or Smart Factory, the older term cyber-physical system (CPS) inevitably comes to mind, which illustrates why Dr. Sommerhoff's sense of QA is understood primarily as a technical task for engineers and IT specialists.

Simpel explained is Quality Engineering about IT management, software and systems engineering, system operation and product management. © [Infostretch](#)

Quality Engineering and CPS

Roughly spoken, a CPS is described as a combination of computer, electronic and mechanical components that communicate via a data infrastructure. An example of CPS would be different manufacturing machines that run computer-controlled and whose workflow, i.e. material feed, [corrections during machining](#), workpiece transfer, etc. functions automatically via an IP network. In order for everything to smoothly run, it must be ensured, for example, that raw material or preliminary products are correctly captured by the machines, a belt or transport robot does not strike in between, makes a part of the [chances and risks](#) of such CPS clear as well as what quality assurance means and requires here: This already very high degree of automation requires perfect process control so that a single drop-out cannot bring the entire process chain to a standstill. This requires the solid knowledge of software and hardware experts, network technicians, materials scientists and

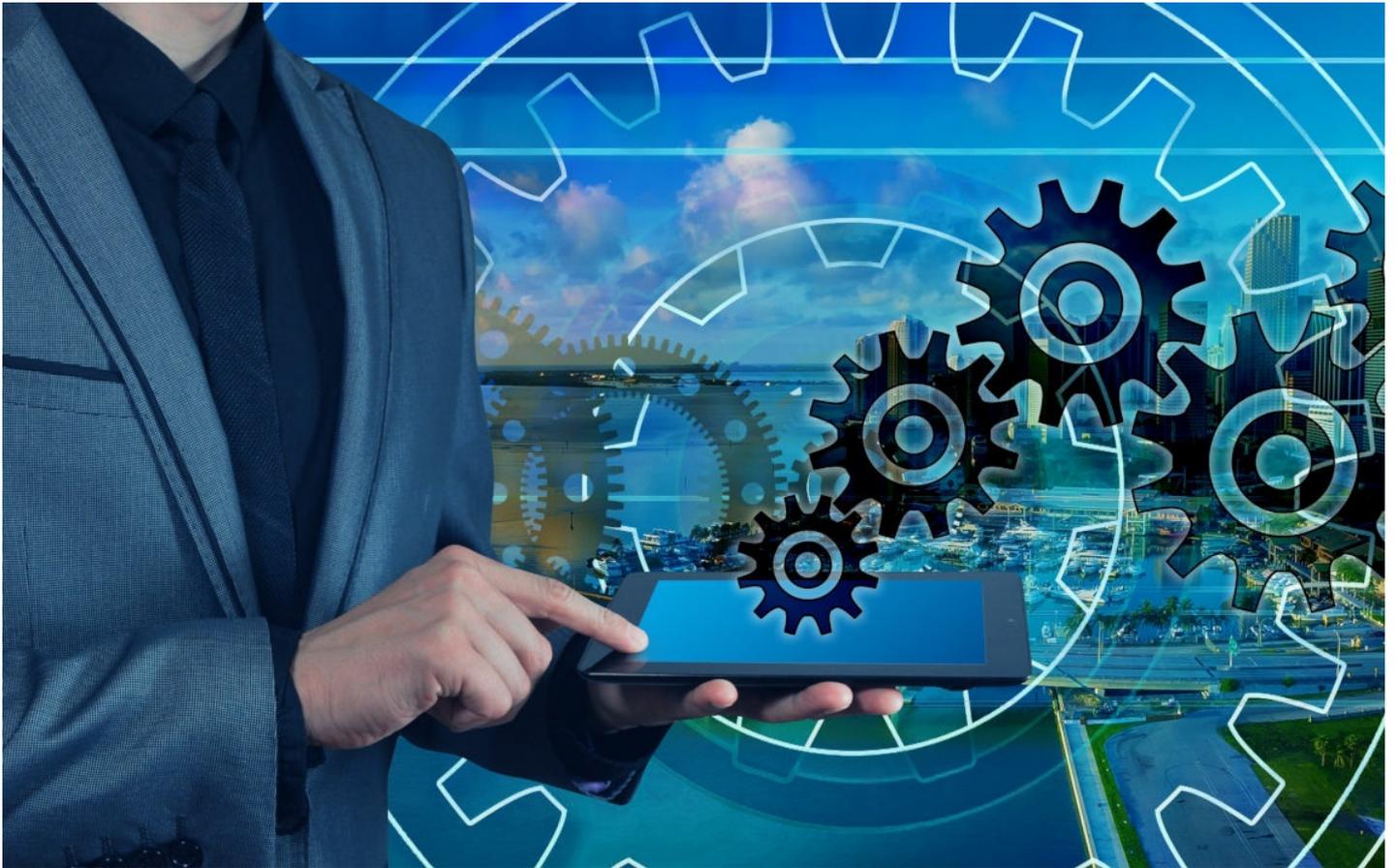
mechanical engineers. And an interdisciplinary team that can take a holistic view of the individual areas with problems, integrate them and guarantee a perfect fit - just like conductors in philharmonic orchestras.

If the complexity of such a CPS makes it susceptible enough, the risks increase if it covers different locations and the [Internet of Things](#) (IoT) has to come into the game, because the communication of data between each other can no longer be handled in a closed local IP network, but requires interfaces to the outside world. The process and supply chains against cyber criminals, who are e.g. seeking blackmail, sabotage or industrial espionage, are becoming increasingly important for IT and its experts in quality engineering - with increasing automation in the direction of Smart Factory, the focus of the Wikipedia definition of quality engineering, which includes IT management, software and systems engineering, system operation and product management, is therefore becoming more and more important.

Quality Engineering on- and offline

This unsettles many companies which are involved in IoT projects. Due to their adaptability, CPS have the charm of being able to respond to individual customer requirements cost-effectively in contract manufacturing. On the other hand, they are risky - industry 4.0 also includes Quality Assurance 4.0! In addition, a QM 4.0 is also required because it is not only the control of the manufacturing processes to which online quality engineering is oriented but also offline methods are needed to design processes. This shows the versatility that quality engineers have to bring with them. And in addition, even business people and lawyers can be found in Quality Engineering - because the business processes that accompany production are increasingly being automated and networked!

Anyone who wants to keep up with this and at the same time protect their company's trade secrets and to ensure the smooth integration of their own process chains into supply chains for the future, as well as their own smooth integration into supply chains, must also think along with [Cyber Security](#) when dealing with the subject of industry 4.0 and must therefore not lose any time, as the international consulting firm [Deloitte](#) warns.



Quality management 4.0 requires the control of the manufacturing processes but also offline methods are needed to design processes.

Internet of Things, Smart Factory and Big Data

In order not to miss the connection to the market, more and more medium-sized and smaller companies are setting up IoT projects that cannot necessarily be successfully managed without external help. Why should they do without it? Especially since they have access to the same resources as their customers in the automotive, mechanical engineering or even aviation sectors.

If you are busy with such problems yourself, but are unsure about covering all the aspects of these buzzwords around Big Data, IoT or the **Smart Factory**, you are welcome to read on in the ARTS blog. There you can read more about the aspects mentioned.

From practice for practice!

Sources: wikipedia.org | quality-engineering.industrie.de | uni-erlangen.de | tae-studium.de | fraunhofer.de | qz-online.de | it-production.com | prolisa.de



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Frank Martini, himself an active pilot, works as a freelance publicist, photographer and filmmaker. In the past 15 years, he has worked as a print journalist, mainly on automotive and aviation topics, and is already frequently involved with complex technical and scientific topics for ARD broadcasters.