

### Prof. Dr.-Ing. Dr. h.c. Detlef Zühlke

German Research Center for Artificial Intelligence (DFKI)

Director Innovative Factory Systems Dept

**P**rofessor Zühlke, what is "Industry 4.0" and what are the implications of "Industry 4.0" ?

Industry 4.0 is a vision – the vision of fully connected and automated production. For us, this means automation technology effortlessly keeping pace with ever shorter product life cycles; new products being flexibly produced in the smallest batch sizes; bringing back highly profitable production to Germany. These are the goals pursued by SmartFactory<sup>KL</sup> together with partners from industry and research. As the pioneer of Industry 4.0, we feel it is the right concept to take Germany back to the top in the manufacturing sector, bring jobs back to Europe – and secure decisive competitive advantages for companies here.

In Germany, Industry 4.0 is officially defined by «Plattform Industrie 4.0», today a federal platform, responsible for coordinating all activities regarding Industry 4.0 in Germany. [www.plattform-i40.de](http://www.plattform-i40.de)

#### How will digitization affect current business models ?

Digitization will lead to a complete change of consumer behaviour. We can see this trend already today: The consumer requires products that he can design individually and order with one mouse-click – and still pay a reasonable price and receive the product within a short time after ordering. This trend requires more just-in-time production close to the customer. In addition, we will see the rise of "individual mass production", meaning that we will be able to configure our individual products more and more flexibly in the future. The Adidas Speed Factory is a good example for this development.

This change in consumption behaviour means that industrial nations will bring production facilities back to their own countries ("re-shoring") instead of only producing products at cheap labour costs in second- and third-world countries.

**Which companies will benefit ? For which companies is "Industry 4.0" more of a threat than an opportunity ?**

Companies that are flexible, ready to adapt their own business models to current demands and creative enough to offer innovative products and services will succeed. This will require not only new levels of production automation, but also new business models as well as employees with new kinds of qualifications (more IT-related).

#### What is your view on the issue of data security ?

There are two approaches to the domain of data security. The first group, of a considerable size, only wants to deal with data security when the IT world can guarantee 100% security. This is illusory since this absolute level of security will never exist. The second group combines various layers of different security systems, which cost a lot of money and cannot offer complete security. This system strongly impairs the usability of data and systems as well as the speed of work. And, we can never reach the 100% level.

It makes sense to find a compromise which must be defined context-specifically. This is especially relevant for the security of non-authorized external access. In addition, security is a continuous task. Just like a virus scan program must be constantly updated, security needs to be monitored on a daily basis. This is a complicated task: in the Internet of Things, hackers can get access to the shop floor level, meaning all the way to individual machines. We can only counter this by being one step ahead. This means that data security must become an integral component of the engineering process.

#### Who will define the standards of "Industry 4.0" ?

We need standards that are accepted and in use on a world-wide level. Otherwise the vision of network production will





not work. However, standardization means that many parties must agree on one standard, but this is not an easy task. When looking at IT technologies, one can see that those standards which are defined by industry and then released for general use (for example Bluetooth or USB) are successful. Currently, the USA are following this track regarding standardization in the domain of Industry 4.0.

In Germany, the approach is to follow standardization organizations such as DIN and DKE. This method follows democratic decision-making and thus slows down the whole process. In a fast-moving IT-dominated world, this is not ideal. That is why I suggest to pursue both paths and then to merge both results. We cannot rule out the possibility that faster nations will overtake us with their approach. In the end, it is up to the market to decide which standards will be accepted and will be successful on a world-wide level.

## **In your opinion, what will be the consequences of Industry 4.0 on human labour and work organisation ?**

Industry 4.0 and with it a clear increase in digitization will lead to a large number of new jobs which will require a higher level of training and education. Computers and machines, or the increase of automation, threatens low-qualified jobs and will most likely render many low-qualified jobs obsolete. However, we will always need humans to engineer, design, build, maintain and repair these machines.

We will see an increase in IT-related qualifications and a stronger co-operation between classical engineering and classical IT. We have already seen such a development

in the past: the car electrician of the past is an automotive mechatronics specialist today. In total, the number of jobs will remain more or less the same, however, the employees will need to be trained and qualified differently to reach this higher level of education. It will be an important task to raise the level of qualification of current and future employees. As such, this phenomenon represents a task for society as a whole.

## **You are the main initiator of the technology initiative 'SmartFactory<sup>KL</sup>'. What is this initiative about and what are its objectives ?**

The Technologie-Initiative SmartFactory<sup>KL</sup> e.V., founded in 2005 as a non-profit association, represents the birthplace of Industry 4.0. It is an Industry 4.0 network of almost 50 industrial and research partners who jointly carry out projects regarding the factory of the future. This co-operation has led to a manufacturer-independent demonstration and research platform, our "SmartFactory<sup>KL</sup>", and as such is unique in the world. (All other projects are manufacturer-dependent and thus lead of a specific company with economic interests). SmartFactory<sup>KL</sup> also intensively cooperates with the German Research Center for Artificial Intelligence (DFKI) in Kaiserslautern and is located in the DFKI building.

## **Interview : Georges Santer, Adviser at Fedil - Business Federation Luxembourg**

**Photos : ©SmartFactory-KL/M. Schäfer**