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> Digitisation creates room for manoeuvre and strengthens competitiveness."

Jonas van Thiel,
Principal, ROI Management Consulting AG

Let us look at the topic of Smart Factory and Industry 4.0 in the context of process industries. Where do you see a need for action here? And what promises can the Smart Factory make in the process industry?

In the process industry we find different conditions than in discrete manufacturing. Connectivity and process monitoring are standard. The processes in the process industry can certainly be compared to the implementation of a cooking recipe. Different raw materials and pre-products are either added successively or mixed together in one set. This process is continuously monitored by SCADA systems. The great challenge in the process industry is not to introduce and operate such systems, but to integrate them with the planning processes, production sequences, approvals and controls. Connectivity is usually provided. However, it is not consistently used to optimise and simplify the control process. Often the link between the subsequent processes and to the planning areas is missing.

Against this background, what steps must be taken to make production really smart?

Traceability is a crucial aspect - regardless of whether chocolate, whisky, cosmetics or medicines are produced. Today, one often has the situation that traceability and control cannot be produced automatically and without media

breaks. Data is still often transferred manually from screens to slips of paper and then transferred to another system.

The more dynamic and critical a process is, the greater the associated risks and inefficiencies. The SCADA system actually contains all relevant information. But the interfaces in processes with many finishing stages and several systems involved destroy efficiency. Breaks between system worlds can unfortunately be observed in many plants.

Why are there no solutions, even after decades, to comprehensively and sustainably integrate production and make it transparent?

There are certainly solutions, such as the interaction of SCADA and ERP systems. But they do not always cover the reality in the factory. An example: The employee can automatically call up centrally stored recipes at the plant and knows which materials are used. If he proceeds exactly according to plan, that is sufficient. But if this employee has extensive experience, which is often the case when producing fine whisky or rum, for example, he may be able to modify the recipe slightly on his own.

He may then write down the material numbers he has added. But not the modified ratio. Someone else will then enter it into the system at some point - and will not have all the information. Traceability is not guaranteed. In general, the fact that manual processes are complex and sometimes error-prone, but well-rehearsed, also plays a role. "Never change a running system" plays a certain role. But this is changing more and more, the advantages of integrated, automated approaches are becoming increasingly clear.

What potential does digitisation in the process industry offer beyond the individual plant, i.e. with regard to the supply chain?

The opportunities are generally always at the interfaces in the value chain. Where my processes and the supplier's processes have to mesh. At these points, a smooth and automated transfer of data is also immensely important. Especially if certain parameters such as temperature and humidity have to be monitored continuously and in real time, but also if traceability really has to be seamless. This is where the harmonisation of data sets and the automatic management of interfaces can unlock great potential - in terms of efficiency, quality and compliance.

Let us take up your example of the production of high-quality spirits again. The transparency that results from a complete digital recording of processes also makes implicit empirical knowledge explicit. This weakens the position of an experienced master distiller. Does this development hold conflict potential and the danger of knowledge loss?

It depends on how one deals with this development. A master distiller has a high level of expertise. However, he may not understand why process parameters should now suddenly be monitored and evaluated by systems with regard to product quality. Because that is exactly his job - even his art! He uses his senses to test the product. At this point it is important to show that one does not want to replace, but to help. After all, what are the goals of digitalisation in production? To stabilise the process, to predict poor quality, to be able to plan comprehensively.

To use the data to understand when deviations occur. Not only solve problems, but massively accelerate the solution processes and gain resilient, available knowledge from each such process to become better and faster and thus more competitive. You have to make sure that employees can rely on the system to use their time, experience and talent for high-quality activities. Digitalisation does not disenfranchise, but creates creative freedom and makes companies more robust. The challenge is to communicate this clearly and credibly and to demonstrate the benefits to every employee. This is already associated with a profound change in the mindset. And it requires a great deal of trust and appreciation from everyone involved.

What is the impact of these changes, of digitisation, in the process industry on innovation and for example on the individualisation of products?

Individualisation does not play as big a role in the process industry as it does in discrete manufacturing and is more of a marketing issue. But one has other possibilities. You can make the whole process of distillation transparent for the customer, I can clearly show which ingredients were used and create a "product journey" for the customer. One can use the time of the top experts to continuously improve quality and develop new recipes in creative but data-supported processes. Our project experiences show that people go along with this path. We experience that for real experts who are passionate about their profession, it is not the knowledge of domination that is in the foreground, but the desire to create outstanding products of which they can be proud.