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Press release

Four winners – digital solutions for the beverage industry

The future looks very promising. A joint study by VDMA and the management consulting company McKinsey & Company investigates just how far product and service portfolio digitalization has advanced in mechanical engineering. They state that the revenue share for digital platforms and value-added services is only around 0.7 percent (about 6 billion euros) of the total European mechanical engineering revenue (around 850 billion euros¹).

The beverage industry shows a similar trend, where the advantages of digital twins, blockchain solutions, artificial intelligence and robotic technology are being steadily implemented. A Siemens study on the food and beverage industry expects that, for the next five years, digitalization investments will reach \$567 billion². But where can the beverage industry use these new digitalization tools? And how can its processes and offerings be reformatted for the future? Many fields in the industry could be solid options for this digital leap:

- the production of drinks and liquid foods
- the construction of beverage machinery
- contact with users and the after-sales service
- financing concepts and financial services
- creating contacts between beverage manufacturers and customers.

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¹ McKinsey & Company, Customer centricity as key for the digital breakthrough (See download section in right-hand column)

<https://www.mckinsey.de/news/presse/2020-09-18-maschinenbau>

² Siemens, Whitepaper "AI in the food and beverage industry"

<https://new.siemens.com/global/en/markets/food-beverage/exclusive-area/whitepaper-ai.html>

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Digital twin

Several of the digitalization tools are particularly well suited for the beverage industry. For example, take the digital twin. By digitally simulating a beverage machine and integrating its data into software tools, functions can be tested in real-time before the machine is built. The digital twin also helps the ongoing machine operations by avoiding downtimes. Moreover, the process data can be shared with others – even beyond one’s company. Before maintenance, the manufacturer can simulate real production conditions and adjust the maintenance intervals to the actual machine load. However, the company providing the data always remains in control of the use of its data³.

Krones is one example of a company currently utilizing digital twin solutions. This packaging machine manufacturer simulates and calculates the positioning performance of three-armed robots in the packaging process via digital twin programs⁴. This allows for status diagnostics improvements to be conducted during ongoing operation, even without access to the physical device.

Blockchain technology

Connection forms the basic principle behind another digital technology that could help evolve the beverage industry: Blockchain. This software system combines data in unchangeable lists via a forgery-proof method (distributed ledger) and can comprehend the entire supply chain of products. Blockchain solutions are already utilized today, particularly for verifying product authenticity. Industry experts predict this could generate savings of \$31 billion by 2024⁵ – all by improving supply chain traceability, reducing the time required and simplifying the recall process.

³ Fraunhofer ISST, press release
https://www.isst.fraunhofer.de/en/news/press_releases/2020/PI_LogiMAT2020.html

⁴ MathWorks, Krones Develops Package-Handling Robot Digital Twin
https://de.mathworks.com/company/user_stories/krones-develops-package-handling-robot-digital-twin.html

⁵ foodbev, Blockchain ‘could save food industry \$31bn’ by 2024 – research
<https://www.foodbev.com/news/blockchain-could-save-food-industry-31bn-by-2024-research>

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Blockchain technology is particularly useful for raw malt. The Beer Group AB InBev, Belgium, recently reported to Leffe beer consumers in France that, from 2021, they could use a QR code to discover the origin of the malting barley and its manufacturing process⁶. It was initially intended to connect grain farmers in the North of France with the malthouses in Antwerp, Belgium, and the Stella Artois brewery in Leuven, Belgium. AB InBev expects the technology will benefit not only consumers, but also the agricultural industry and its environmental footprint.

Blockchain solutions will also soon provide comprehensive product information for Sake, the traditional Japanese rice wine. Distributed ledger technology for the Sake blockchain⁷ will gather information regarding the ingredients, brewing process and control measures into the supply chain. The consultants for this project expect that this will lead to a higher price for the product.

Artificial intelligence

Artificial intelligence (AI) can also play an impressive role in the continued development of digital solutions for the beverage industry. A cross-industry study by Fraunhofer Institute for Industrial Engineering IAO of over 309 companies shows that 75 percent of the surveyed companies are currently engaged with AI and 16 percent already utilize AI.

For example, AI has already generated 70 million recipes for whiskey manufacturing. Mackmyra, a Swedish whisky distillery, utilizes it to automate the challenging aspect of recipe generation. The distillery combines machine learning models and calculation algorithms via a data cloud to calculate new recipe component combinations. Thereby, the company hopes to offer

⁶ ABInBev, From barley to bar: AB InBev trials blockchain with farmers to bring supply chain transparency all the way to beer drinkers

<https://ab-inbev.eu/news/from-barley-to-bar-ab-inbev-trials-blockchain-with-farmers-to-bring-supply-chain-transparency-all-the-way-to-beer-drinkers/>

⁷ AIPIA, Japanese Sake to get Blockchain security as exports boom

<https://www.aipia.info/news-Japanese-Sake-to-get-Blockchain-security-as-exports-boom-1170.php>

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consumers innovative whiskey flavors⁸. In fact, the first whisky based on these calculations has already been created: It was awarded “Gold” by the American Distilling Institute.

Artificial intelligence can also help prevent food waste. A sponsored project currently utilizes AI to research methods for reducing food waste by up to 90 percent. Two supply chain points are crucial here: minimizing overproduction and avoiding wastage. This allows for consumer demands to be more accurately predicted and for production infrastructure to be able to react quickly to both fluctuating demand and differences in the quality of raw materials.

Robots – cleaning the plant

Robotics, digital twins and artificial intelligence have been combined in the intelligent cleaning robotics for interiors and exteriors. A research team from the Fraunhofer Institute for Process Engineering and Packaging IVV in Dresden has developed two types of modular cleaning robots: One drives through the production plant via conveyor belt and cleans it from the inside, the second cleans the floors, ceilings and walls of rooms, as well as production machine exteriors. An extendable robotic arm with a jet cleaner also reaches the higher-up areas. This mobile, modular device drives autonomously through the production hall. Installed sensors determine the level of dirt and adapt the cleaning parameters, such as the pressure and amount of cleaning foam.

This is also possible with a self-learning AI system: It selects the appropriate cleaning parameters and specifies the process steps. The process data are displayed via simulation in a virtual twin. The level of dirt is then transmitted to the 3D model of the plant. Depending on the distance of the cleaning device from the surface in question, the spray pressure can be adjusted as necessary.

⁸ Cision, Mackmyra Intelligens, The world's first whisky created by AI wins gold
<https://news.cision.com/mackmyra-svensk-whisky/r/the-world-s-first-whisky-created-by-ai-wins-gold.c3112197>

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The intelligent factory is within reach

The networked, adaptive and real-time production simulations are not far off. Moreover, the benefits are also quantifiable. But one thing should not be forgotten: People need to be able to interpret and handle the data. Data scientists are acting as the domain experts to develop the data usage in the process. A project under the consortium leadership of the Bitburger Brewery Group, Bitburg, with the Augustiner brewery, Munich, is currently developing a data-based method for predicting the malt processability, lautering time and the yeast processing yield.

However, all things considered, questions of approach remain relevant in the industry: For digital projects, the industry association VDMA⁹ recommends mechanical engineers start with manageable project sizes to gain initial experience.

These trends are sure to make for yet another exciting drinktec 2021 (October 4 to 8, 2021) in Munich. For many industry partners, machine and solution providers and beverage production and logistics users will be presented with new options for future technologies. All industry participants can benefit from these innovations in the creative process of further developing digitalization.

About drinktec

drinktec has been held in Munich since 1951 and every four years since 1985. It is the most important event in the industry. Manufacturers and suppliers from all over the world, including global concerns and SMEs, meet here with producers and retailers of all sizes in the beverage and liquid food sector. The future is shaped at drinktec. The trade fair is regarded as the number one platform for world premieres. Manufacturers showcase their latest technologies for the production, filling and packaging of all kinds of beverage and liquid food – including raw materials and logistics solutions. The themes of beverage marketing and packaging design round out the portfolio. The next drinktec will be held in Munich from October 4 to 8, 2021.

⁹ VDMA Guidelines for artificial intelligence
<https://bayern.vdma.org/viewer/-/v2article/render/49875406>

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