PRESS RELEASE

Zeros and Ones at the Factory– Smart Data Management Becomes Top Priority for Manufacturing Companies

Industrial manufacturing generates a growing amount of data, which – evaluated and put into context in a targeted manner – enables extremely flexible reorganization of production. Together with experts from the manufacturing industry, Fraunhofer IPK has discussed which methodological and technological innovation tasks are associated with this.

No matter who you talk to in the industrial environment, everyone faces the same challenge: how can we continuously collect data and store it appropriately, transmit it securely and analyze it intelligently? The goal is clear: to use data-driven solutions to make processes more efficient or generate new business models. But how is this supposed to work?

From selective monitoring to the 360° digital twin

Today, wireless units in machine tools provide network capability, and sensors transmit a wide variety of operating data. This allows users to monitor machine behavior or optimally adjust machining processes. That, however, is only a fraction of the possibilities. The picture becomes more comprehensive with a so-called digital twin. As an image, it reflects reality in the form of models and data. This applies to processes, machines, plants, products and services. Although the technology has reached application maturity, it has so far only been used sporadically in practice. »Imagine if all process levels in a company, from product development and purchasing to production and assembly, sales and marketing, were underpinned by such systems«, says Dr.-Ing. Kai Lindow, head of the Virtual Production Creation division at the Fraunhofer Institute for Production Systems and Design Technology IPK. »If they were also linked across disciplines, the result would be a 360° twin, a highly integrated corporate image, that can help bring a previously unattainable degree of efficiency to value creation.«

Collecting suitable data sets with IIoT platforms

However, even established companies in the manufacturing industry are still in the early stages of using data intelligently. Because the challenges begin earlier. To start any manufacturing digitization, the first step is to analyze which data make sense for the company-specific use case. The goal is to move from big data to smart data in order to make data volumes manageable and to collect precisely the data that is of value to the respective company. Extracting meaningful data from raw data requires new IoT architectures, supported by cloud and edge technologies for use in production. The complex interplay of data ecosystem, infrastructure and services is being investigated,

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among other things, in the European cloud project »Gaia-X«, in which researchers from Fraunhofer IPK are participating. Here, data security and data sovereignty are also addressed.

Product data management throughout the lifecycle

»There is a lot of catching up to do in the area of end-to-end data flows«, states Dr. Patrick Müller, member of the management board of CONTACT Software. There are various reasons for this: »For example, there are many IoT platforms, but almost all of them serve a limited field of application. This makes it difficult to establish connectivity in order to bring together data from all relevant areas of the company in the sense of integrated applications, for example cockpits.« The next logical step in data handling must therefore be to link comprehensive product lifecycle management (PLM) with process control right down to the shop floor, so that design data, for example, can be used to set up manufacturing processes without any detours. If data from suppliers is included in addition to a company's own data, companies can quickly develop alternative courses of action from this environmental information if, for example, a supply chain breaks down.

Data-based value creation increases profitability

Smart data management will become essential in the future if companies want to simplify or accelerate their processes – for example, with the help of artificial intelligence (AI) and machine learning. Intelligent process control is becoming a reality, as are adaptive assistance systems that support the handling of variants, quality assurance or the maintenance of machinery. Service offerings based on machine data will enable new business models. Efficient data handling, secure data transmission and intelligent data use will thus raise value creation in industrial production to a new level, Dr. Kai Lindow is certain. »Together with our partners from industry and science, we at Fraunhofer IPK will increasingly develop solutions and technologies for this in the coming years«, says Lindow.

Further information:

Fraunhofer IPK asked industry representatives what challenges and needs manufacturing companies will face in the coming years. The result: in addition to digitization and networking, five R&D trends have top priority across all industries. All trends and background information can be found online at https://www.ipk.fraunhofer.de/de/kompetenzen/industrietrends.html. We will be happy to send you a free print copy of our publication on request.

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