

Discrete Manufacturing and Process Industry

Unified Manufacturing and Production IT: A Bridge Between Two Worlds



Motivation

Imagine you are standing on the banks of a river. On one side of the river you can see the discrete production — a world where every single piece counts and is counted. On the opposite side is the process industry, a realm of masses and mixtures, where kilograms and liters call the shots. You might think they are two different worlds. But far from it — the boundaries between these worlds are becoming increasingly blurred. Manufacturers and producers navigate between both shores every day in search of the ideal manufacturing IT that unites both sides. Welcome to the era of Unified Manufacturing IT.

Alongside the classic Manufacturing Execution System (MES) for discrete manufacturing and software for the process industry, solutions are needed that are at home on both sides. After all, powders or liquids are often produced in a first step (process industry), which are then filled or pressed, and finally packaged (discrete manufacturing). One might think that this would require two different systems that map the specific requirements of each world, which would lead to high-maintenance interfaces between the systems. Furthermore, comprehensive evaluations would hardly be possible, as evaluation criteria in both worlds are quite different. Does it really have to be like this? Let's have a detailed look at both worlds.

A platform, consistent data and planning instead of interface chaos:
Unified Manufacturing IT connects pieces and kilograms”

“A system for both worlds that makes key figures comparable, ensures quality
and reduces wastage.”

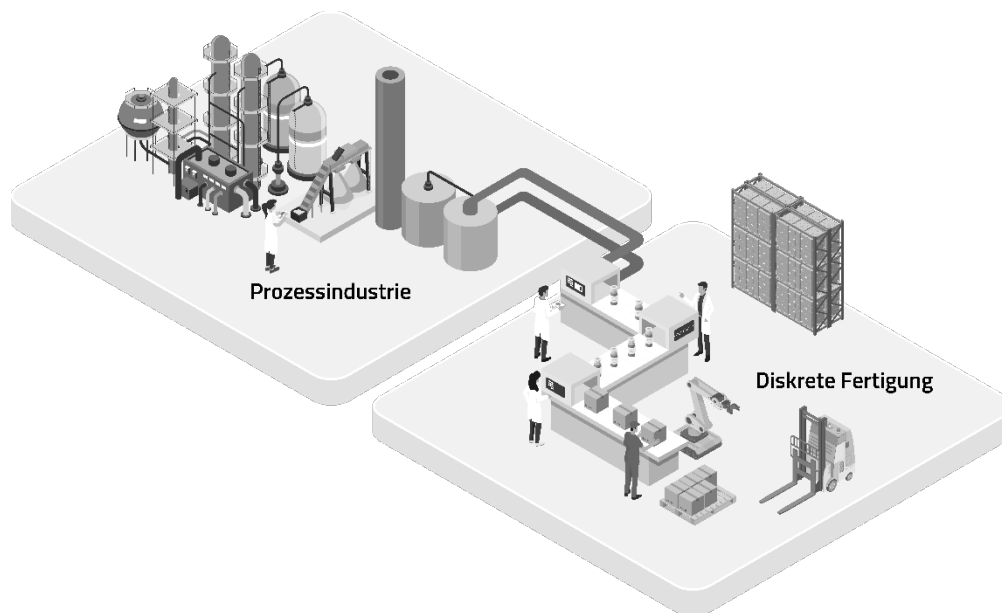


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Two sides, one goal

The main difference between discrete manufacturing and the process industry is obvious: one is about quantities and the other is about kilograms or liters. Parts produced in discrete manufacturing can be counted. For manufactured powders or liquids you need a scale, a measuring cup, or larger containers to determine the quantity. Fortunately, there are also input materials in discrete manufacturing that cannot be counted, for example plastic granulate in injection molding. Units such as kilograms or liters are therefore not uncommon.



Procedures in the process industry often merge seamlessly into discrete manufacturing processes. For this you need a suitable manufacturing IT. (Source: MPDV)

Example: scrap

It is worthwhile to have a closer look at it. In **discrete manufacturing**, all manufactured parts that do not meet the requirements are referred to as scrap. The calculation of the scrap rate is quite simple: divide the number of defective parts by the total number of parts produced.

It is not quite so simple in the **process industry**, as the entire quantity produced becomes unusable if it does not meet the quality and recipe requirements. The aim is to manage all raw materials and components in the right quality, time and quantity to make them traceable and to record how much of the material used actually ends up in the finished product. Waste is caused, for example, when material spills next to the target container during weighing or when residues remain in the machine after mixing. The calculation of the waste must integrate different quantities of material and is therefore not so easy to calculate. But with the right IT system, this is definitely achievable.

Example: machine data collection

Differences also exist in the collection of machine data. The cycle plays a central role in discrete manufacturing, i.e. the time that the machine needs to produce a part or perform a stroke plays a central role in **discrete manufacturing**. There is no equivalent in the process industry. Such differences arise when calculating important key figures such as the OEE index (Overall Equipment Effectiveness), in which both the cycle and waste are included — at least if this key figure is calculated in the discrete world.

You need other methods to calculate key figures in the **process industry**. However, there are ways of accommodating the different conditions in the discrete manufacturing and process industry. But what about the requirements for the manufacturing IT?

Sharing common solutions, bridging differences

First of all, there are common requirements for manufacturing & production IT, which can be summarized under the headings transparency, efficiency, and quality.

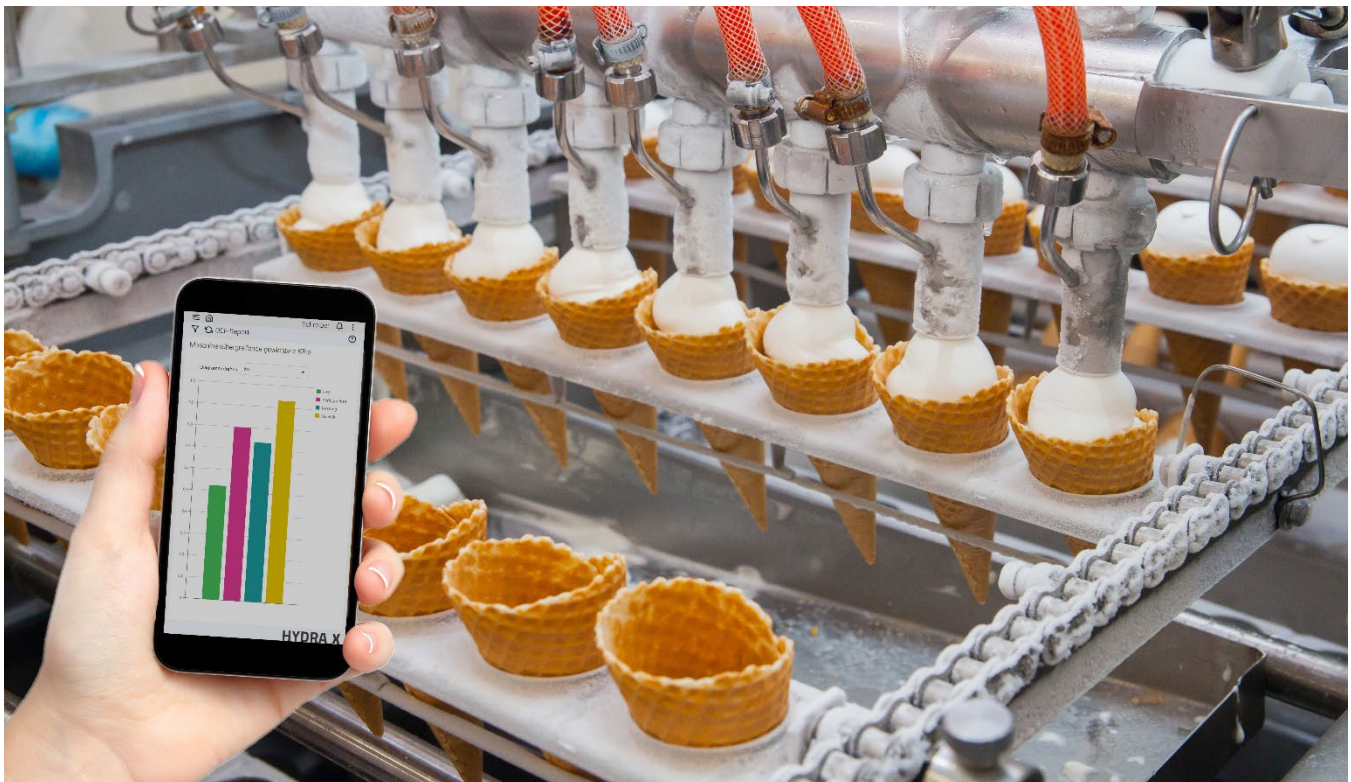
- **Transparency:** data must be recorded and displayed in production
- **Efficiency:** production orders must be precisely planned
- **Quality:** all manufacturing processes must be continuously monitored and traceable

Differences between discrete manufacturing and the process industry are in the detail:

- Different **data** is recorded: piece numbers and cycles vs. volume and processing time.
- The **primary decision criteria** differ when it comes to planning: availability of machines and tools vs. durability of materials.
- There are significant differences in **quality monitoring**: assessment of individual samples vs. inspecting entire quantities or production batches.

There are also specific processes that only exist for the process industry and discrete manufacturing. For example, in the process industry we have the weighing, dosing, and mixing of liquid or powdered raw materials.

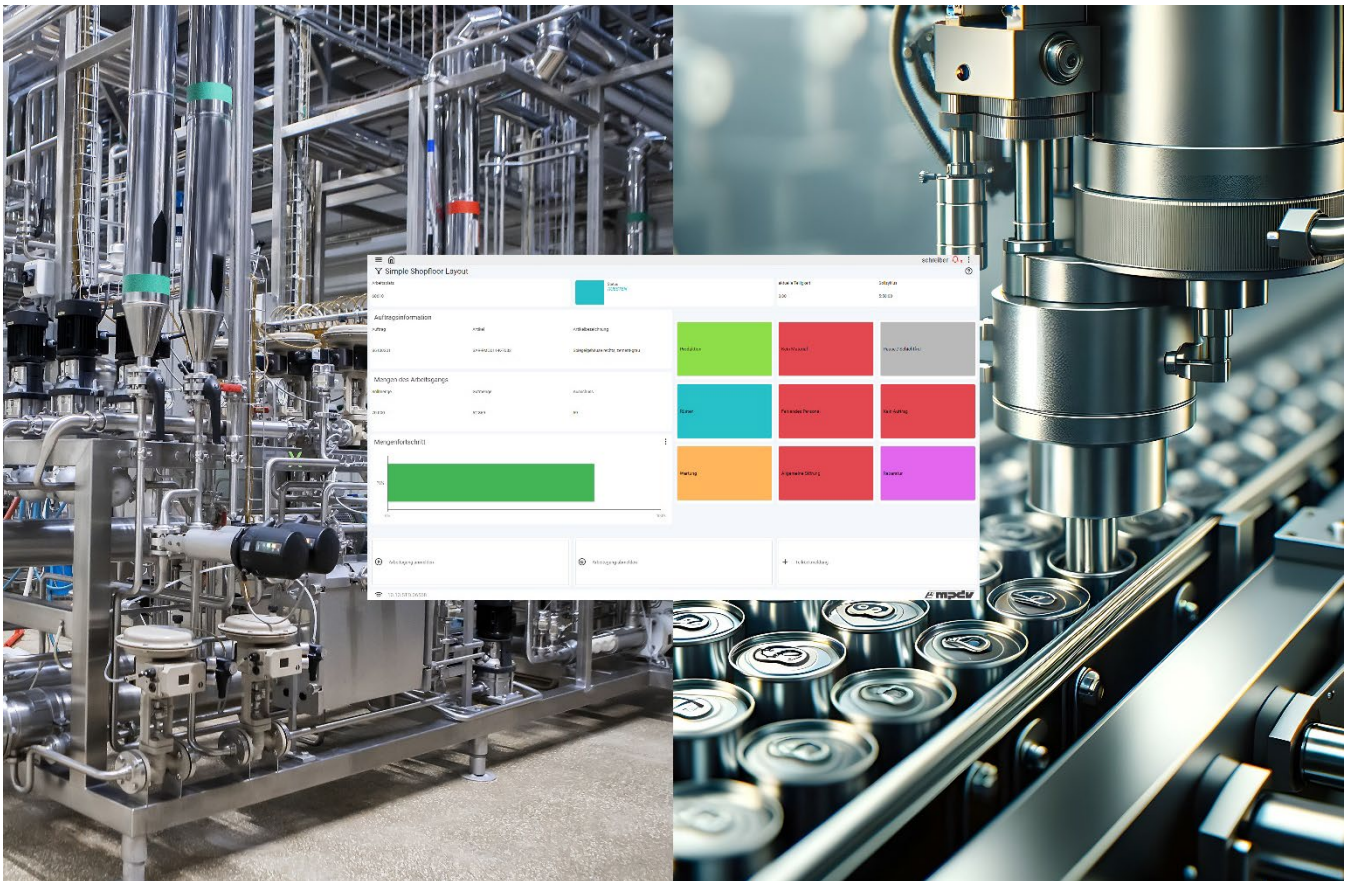
The calculation of order progress also poses different challenges for manufacturing and production IT, but these are by no means incompatible. While a discrete operation can usually be measured by the number of items produced, order progress in the process industry usually depends on the time that has elapsed since the operation began. In addition to the many similarities, there are also differences that manufacturing IT must map efficiently.



Unified Manufacturing IT such as the Manufacturing Execution System (MES) HYDRA X from MPDV overcomes the boundary between the process industry and discrete manufacturing (Source: MPDV, Adobe Stock, asayenka)

From idea to reality: Unified Manufacturing IT

Most requirements can be extrapolated that the joint use of a software function is possible in both worlds. Other requirements should be covered by specific functions. Recording data and planning production activities are functions that can typically be used in both worlds. Separate applications are usually needed for monitoring quality and for specific processes, as requirements and methods vary significantly. This also applies to key figures, which are calculated differently. However, the result is always the same — a meaningful and reliable indicator of performance and quality in production.



Unified Manufacturing IT — a bridge between two worlds (Source: MPDV, Adobe Stock, DZMITRY PALUBIATKA, KeetaKawee)

So what if you could link isolated functions and special applications? Such a collaborative manufacturing IT system enabling comprehensive evaluations and planning exists and is known as Unified Manufacturing IT.

Conclusion: A new era of manufacturing IT

Ultimately, it all depends on what the customer needs. Avoid anything that does not directly contribute to added value, such as unnecessary waiting times or rejects. The good news is that with the right manufacturing IT you are on top of things in discrete manufacturing and also in the process industry. This means a solution that does justice to both worlds. Software that can juggle with piece numbers and handle kilograms and liters at the same time. Unified Manufacturing IT is not just a dream, but a realized vision that increases efficiency and effectiveness to a new level. Welcome to a new age of manufacturing IT, where the boundaries between worlds are not just blurring, but disappearing for good.

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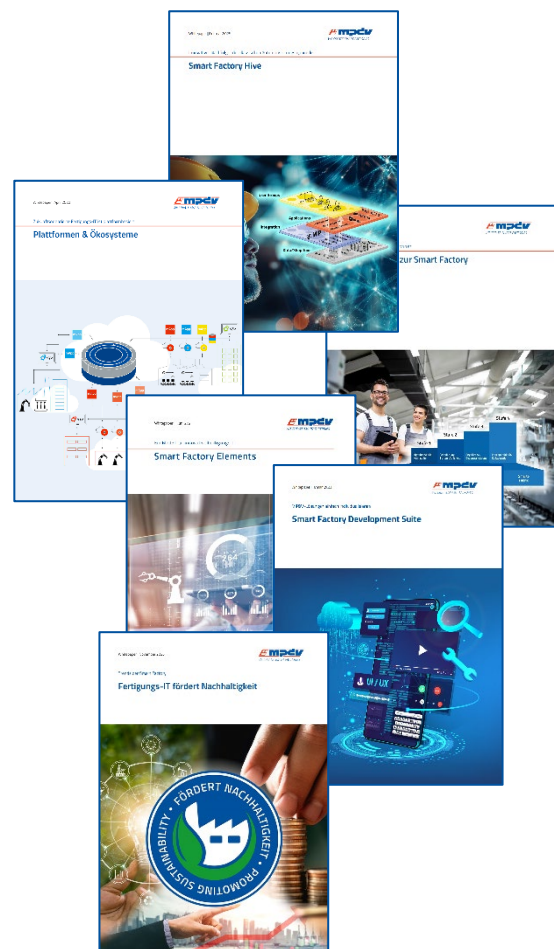
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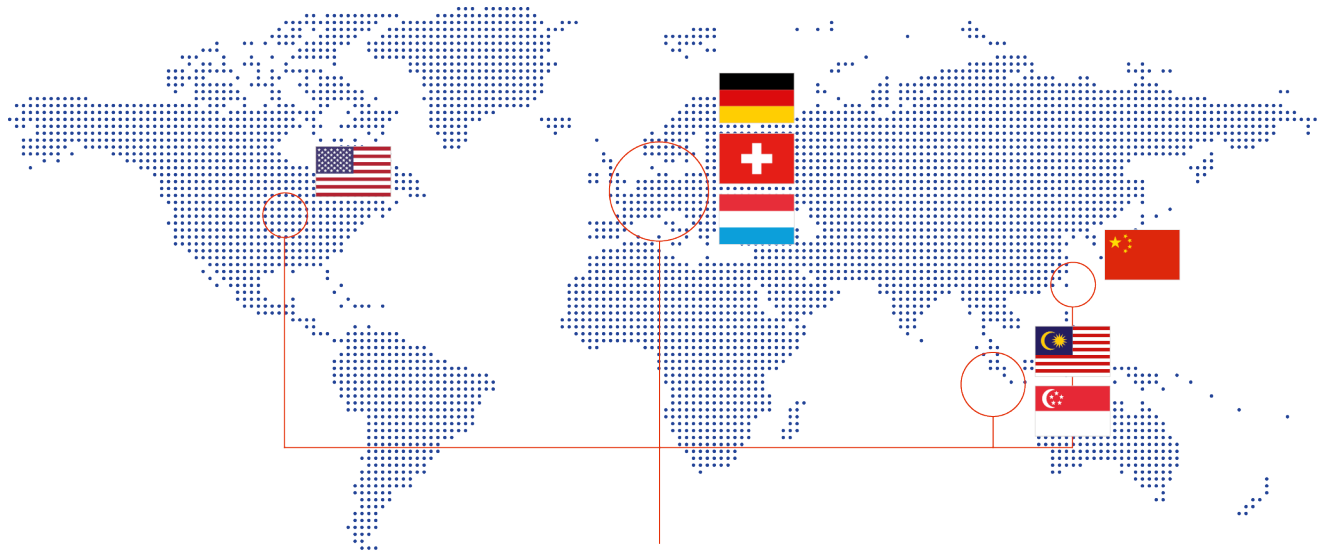


MPDV Mikrolab GmbH

headquartered in Mosbach/Germany, is the market leader for IT solutions in the manufacturing sector. With more than 45 years of project experience in the manufacturing environment, MPDV has extensive expertise and supports companies of all sizes on their way to the Smart Factory.

MPDV products such as the Manufacturing Execution System (MES) HYDRA, the Advanced Planning and Scheduling System (APS) FEDRA or the Manufacturing Integration Platform (MIP) enable manufacturing companies to streamline their production processes and stay one step ahead of the competition. The systems can be used to collect and evaluate production-related data along the entire value chain in real time. If the production process is delayed, employees detect it immediately and can initiate targeted measures.

Users of MPDV solutions include well-known companies from all industries. MPDV was founded in 1977 and is active worldwide at locations in Germany, China, USA, Malaysia, Singapore, Luxembourg and Switzerland.



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