



SIEMENS

Ingenuity for life

Greater flexibility
on the path to more
individual products

Digitalized solutions for the dairy industry

[siemens.com/dairy](https://www.siemens.com/dairy)

Digitalization changes everything

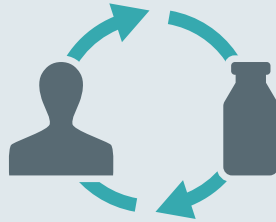
There are new technologies that provide us with an initial impression about the new possibilities of producing food in the future. However, the world population is growing fast, and we have to produce food on a large scale. Nevertheless, the digital revolution is significantly affecting and changing the food and beverage market. Today's consumers are changing the way they order their groceries, they ask for individualized products for the same price as mass products – and they want these products immediately and are not willing to wait. The range of different flavors and product variants has never been greater, not least because of the increased health and fitness awareness of today's consumers. Other food trends can also be identified such as low fat, low carb, and personalized nutrition, meaning special food for people who have to avoid some ingredients like lactose or gluten.

All these changing consumer and market trends represent a challenge for food and beverage producers as they mean an increasing amount of product variants, recipes, and brands that need to be developed, produced and managed. This makes food and beverage production, which is today mostly a typical mass production, much more complex. When producing any type of food or beverage it is mandatory to consistently monitor the raw materials and the product over the whole production process. Managing a huge product variety, smaller batch sizes and of course maintaining a high quality level requires a major change in the way food and beverages are produced today.

Challenges in the dairy industry



Increasing variety of products and recipes



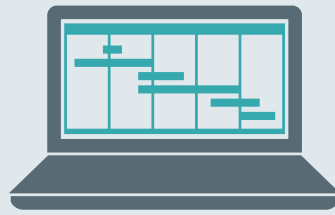
Complex coordination between customer demands, filling orders



Global and regional regulatory compliancy



Cost pressure



Manual production scheduling



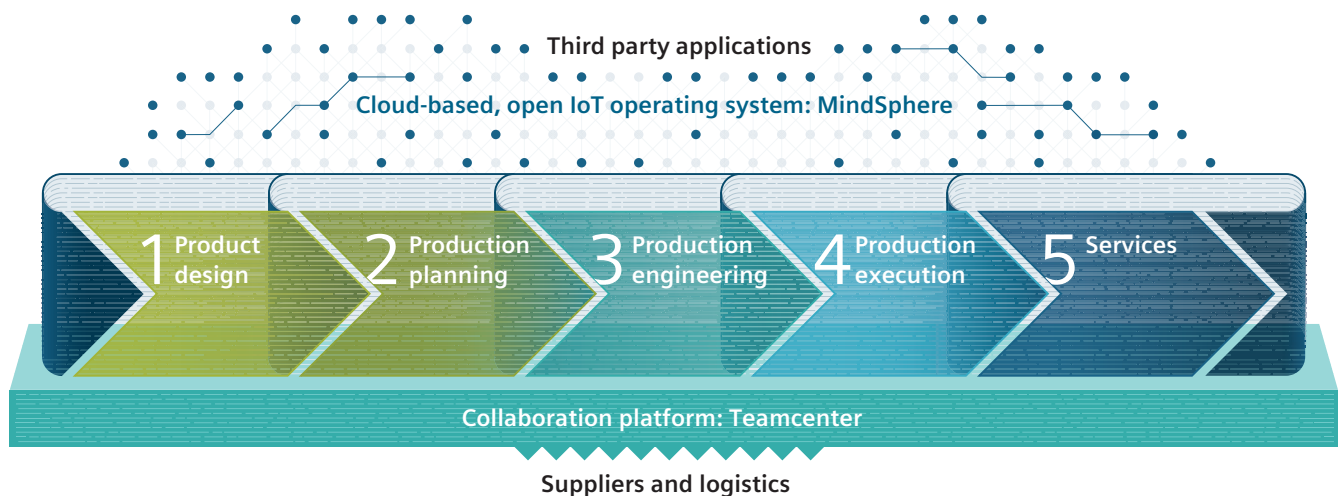
High quality demand

Digitalization for dairy

Both discrete and process workflows in the dairy industry can benefit from digitalization. At Siemens, we call our portfolio for digitalizing the industry the Digital Enterprise. It is based on a holistic approach that transforms the traditional value chain of a product into an integrated product and production lifecycle – from product design to production planning, engineering, execution, and services. Only a fully digitalized business model with a consistent digital thread has the power and flexibility to speed up processes and optimize production operations.

With our solutions it's possible to create digital twins of the dairy products, plants, and production lines to simulate and optimize the entire workflow. We also enable the integration of individual machines in the plant (also known as bottom-up approach) as well as the top-down approach that allows the central engineering of the entire plant. Both approaches ensure the comprehensive digitalization of the engineering process.

After design and engineering, the digital twins allow for virtual commissioning, so that all previous development steps can be efficiently validated. Production process and bottling also benefit from simulation and optimization with digital twins. Machines and production lines connected to MindSphere, our open, cloud-based IoT operating system, enable an entirely new dimension of transparency, resulting in additional opportunities for optimizing processes with added value for the client: shorter time-to-market, more flexible engineering, optimal product quality, and greater plant availability and efficiency.



The holistic approach to optimize the entire value chain

Every step brings a benefit

1 Product design



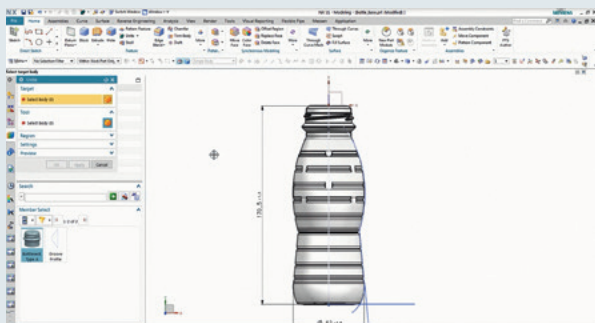
Challenge:

In a market where new products are continuously being introduced, with production factories located in different countries, using different raw materials, food and beverage manufacturers have to ensure, that the taste and the quality of the product is the same. They also have to fulfill all national regulations when marketing a brand on different countries.

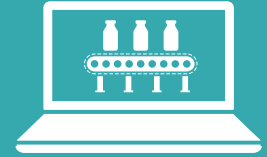
Solution:

With SIMATIC IT R&D Suite you can define the product composition and simulate product performance: this enables you to meet the product requirements. R&D Suite supports the formula optimization process and includes a regulatory assessment to ensure the compliance to national and international law.

With Teamcenter NX you can create the digital twin of the product package, simulate and stress-test the packaging: in this way you find the right fit between a cost efficient and an attractive and appealing design.



2 Production planning



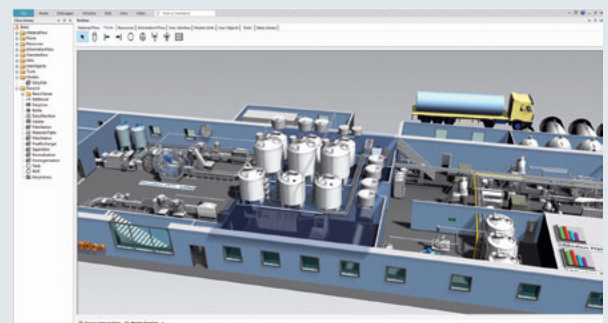
Challenge:

After the product has been designed, you need to produce it on a large scale. This is a typical challenge for many industries, since the R&D and the production department are often disconnected.

Digitalization is the key to close the gap between digital formulation and production, to make sure that the same product in the same quality can be produced at different sites, to verify production planning and assess capacities before investing.

Solution:

COMOS and Tecnomatix can meet this challenge with efficient planning and simulation capabilities. The creation of the digital twin of your entire plant will help you to simulate critical processes, check the material and product flows, validate the production capacity, identify bottlenecks and overcapacities. Finally, it allows you to simulate what-if scenarios to find the right concept before you commit any resource in the real world.



3 Production engineering



Challenge:

Engineering is built on the foundation of production planning. In this phase, all mechanical and electrical components as well as the automation steps have to be engineered in detail. Integrated workflows increase engineering efficiency both for the production process and for filling and packaging.

Solution:

Two main approaches are common in engineering: either a comprehensive top-down approach, which foresees the central engineering of the entire plant, or a machine-oriented bottom-up approach, which follows the integration of individual machines in the plant.

Siemens offers the SIMATIC PCS 7 process control system for the top-down approach or TIA Portal for the bottom-up approach, which is suitable for both the production process and for filling and packaging.



4 Production execution



Challenge:

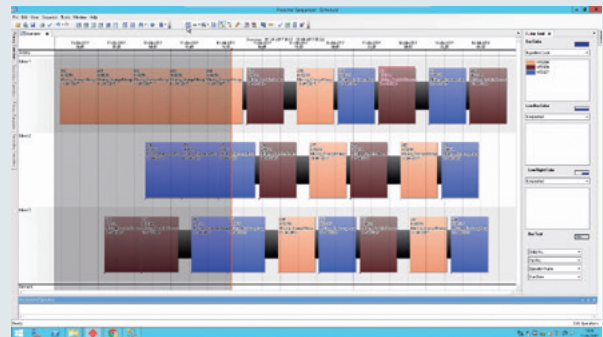
The production execution links the virtual world of planning with the real world of production. To achieve this F&B manufacturers must synchronize manufacturing operations with business processes.

Solution:

SIMATIC IT Preactor offers the possibility to plan and schedule orders based on cost, energy consumption, the availability of material, equipment, employees and other process related constraints like cleaning in process (CIP).

Siemens technology makes it easier to get transparency of your production assets, calculate and report KPIs like OEE and even react with line balancing algorithms in order to avoid downtimes.

This is all possible with the F&B specific concepts based on SIMATIC and SIMATIC IT technology.



5 Service



Challenge:

In all the steps data arise: how to unlock these data assets and put them to profitable use to increase availability, quality and efficiency across the value chain?

Solution:

MindSphere is an open ecosystem that enables connection to all industrial devices and in this way makes data from worldwide distributed machines and assets valuable. In this way we transform data into value!

Siemens has developed two new MindSphere applications dedicated to the F&B industry. With dozens of plants, distributed all over the world, F&B companies must be able to display and benchmark relevant KPIs for their production lines. No matter if the focus is on the product quality or the efficiency of the filling and packaging lines.

MindSphere is the answer to provide the right information to all stakeholders within a complex and distributed organization.



“In the area of digitalization our customers require answers in order to improve efficiency and be ahead in time for the future.”

Kai Schneiderwind,
Head of the VSS Food & Beverage

Digitalization benefits valuable parts of the production. The integration of data rises and enables different collaborations to grow together. Process, product and production efficiency increase as a result of insights, developed from collected data. Wide amount of scenarios are predictable with the use of the digital twin and no real world resources are blocked for this.

Find out more at [siemens.com/dairy](https://www.siemens.com/dairy)

