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transformation a  
reality – now

Unlock the potential of digitalization  
in the bakery and confectionary  
industry

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# Facing the challenges

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 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 producers as they mean an increasing amount of product variants, recipes and brands that need to be developed, produced and managed. This makes food production, which is today mostly a typical mass production, much more complex. When producing any type of food it is mandatory to consistently monitor the raw materials and the product over the entire 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.



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Increasing variety of products and recipes



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Reaction to seasonal changes



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Global and regional regulatory compliance



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Cost pressure



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Individualized label design



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High quality demand

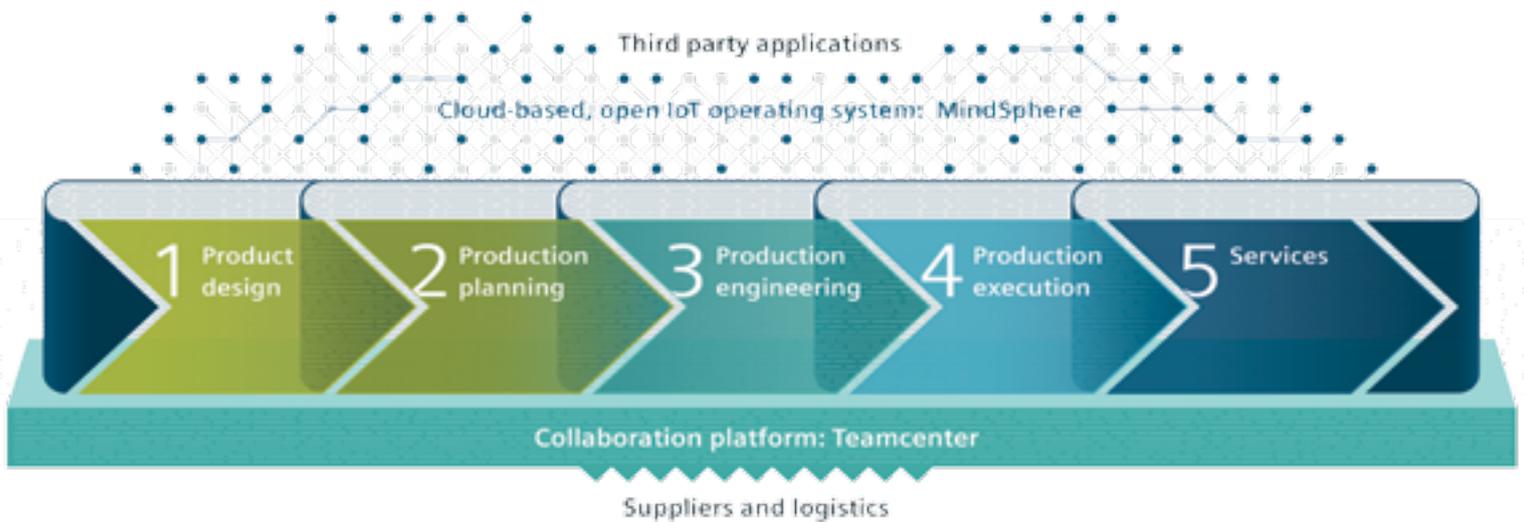
# Benefit from the advantages of the digital transformation

Take the first step towards digitalization right now and create a lasting competitive edge for your company with the scalable solutions from Siemens. Now is the right time to start – become a digital enterprise and stay ahead of the competition.

In order to do so it's not longer enough to optimize just a few steps in the value chain. Instead, a holistic approach is necessary. Siemens has developed the right portfolio for this: The Digital Enterprise Suite links together all phases and process steps digitally and consistently, up to the suppliers. The comprehensive concept of the Digital Twin encompasses the entire value chain in three forms: Digital Twin of the product, Digital Twin of the production and the Digital Twin of performance. At any point of the value chain from product design up to service you can gradually expand digitization, depending on current needs of your company – even with existing systems and solutions.

This is our holistic approach across the entire value chain. Tailor-made for your challenges: Product manufacturers, who are supported from product design, production planning, engineering, production execution to services. The planning of more efficient and flexible production processes can be ensured by on a common collaboration platform and an enterprise-wide data backbone called Teamcenter.

MindSphere allows to analyze the behavior of production plants and products in practice and for ongoing optimization to report all findings back into the entire value chain. MindSphere collects data from the real world – and thus provides additionally to the analytical model of the Digital Twin a statistical model. The comparison of both models can be used for continuous improvement.



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 and quality, food 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 the product nutrition table: this enables you to meet the customer product requirements. R&D Suite supports the formula optimization process and includes a regulatory assessment to ensure the compliance to national and international law. Furthermore, the SIMATIC R&D Suite can support you in topics like compliance control and quality management. Therefore, you can track the product-relevant parameters over the production cycle. The creation and simulation tool NX provides a smooth construction process of the packaging. From the first blueprint to the concluding stress test simulation. Knowledge about loading cases simplify the logistics later on.



## 2 Production planning

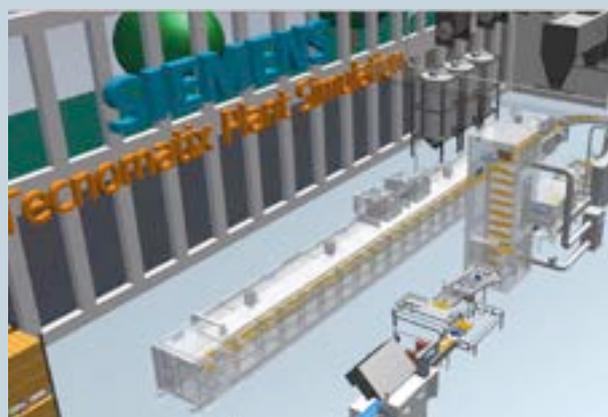


### Challenge:

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:

Tecnomatix portfolio can meet this challenge with efficient planning and simulation capabilities. The creation of the Digital Twin of your entire plant, for example, with Plant Simulation, 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. From small temperature changes to the replacement of a machine or even a robot. Tecnomatix closes the gap between designing and producing the product.



## 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 packaging.

### Solution:

Totally Integrated Automation Portal (TIA Portal) – controllers, distributed I/O, HMI, drives, motion control and motor management are seamlessly integrated into a single engineering environment. Its integrated library concept supports global standardization. With TIA Portal you can generate PLC code that ensures the complete automation of your plant and you open the door to the world of Totally Integrated Automation (TIA). It includes powerful and scalable automation hardware that works seamlessly with other elements of the system. A virtual commissioning makes it possible to simulate and validate the engineering before the start of production, which means you can virtually start up your machine, before you send the start-up engineers. This results in reduced costs, a quicker commissioning and lowered risks.



## 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). Furthermore, the Siemens Manufacturing Operations Management (MOM) software portfolio enables you to implement your strategy for the complete digitalization of manufacturing operations. Siemens Energy Management concept Totally Integrated Power is tailored to your needs and helps you to stay ahead of the competition by minimizing downtime and maximizing energy efficiency. Secure your plant data with Siemens IT Security. The top priority is to be faster than hackers and uncover security gaps before anyone else. 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 the cloud-based, open IoT operating system from Siemens that connects your products, plants, systems and machines, enabling you to harness the wealth of data generated by the Internet of Things (IoT) with advanced analytics. In this way we transform data into value! MindSphere is open for app creation from various partners, for individual challenges in the F&B industry. Collected data from the machines is used for predictive maintenance and decreases downtimes. It opens F&B companies the possibility to display and benchmark relevant KPIs for their production lines all over the world. 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.



“The next trillion dollars will be earned with data – for our customers and for our industries”

Michael Dell, founder of Dell Inc.

Use digitalization to create benefits out of your data and secure your competitiveness. 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/bakery](https://www.siemens.com/bakery).

