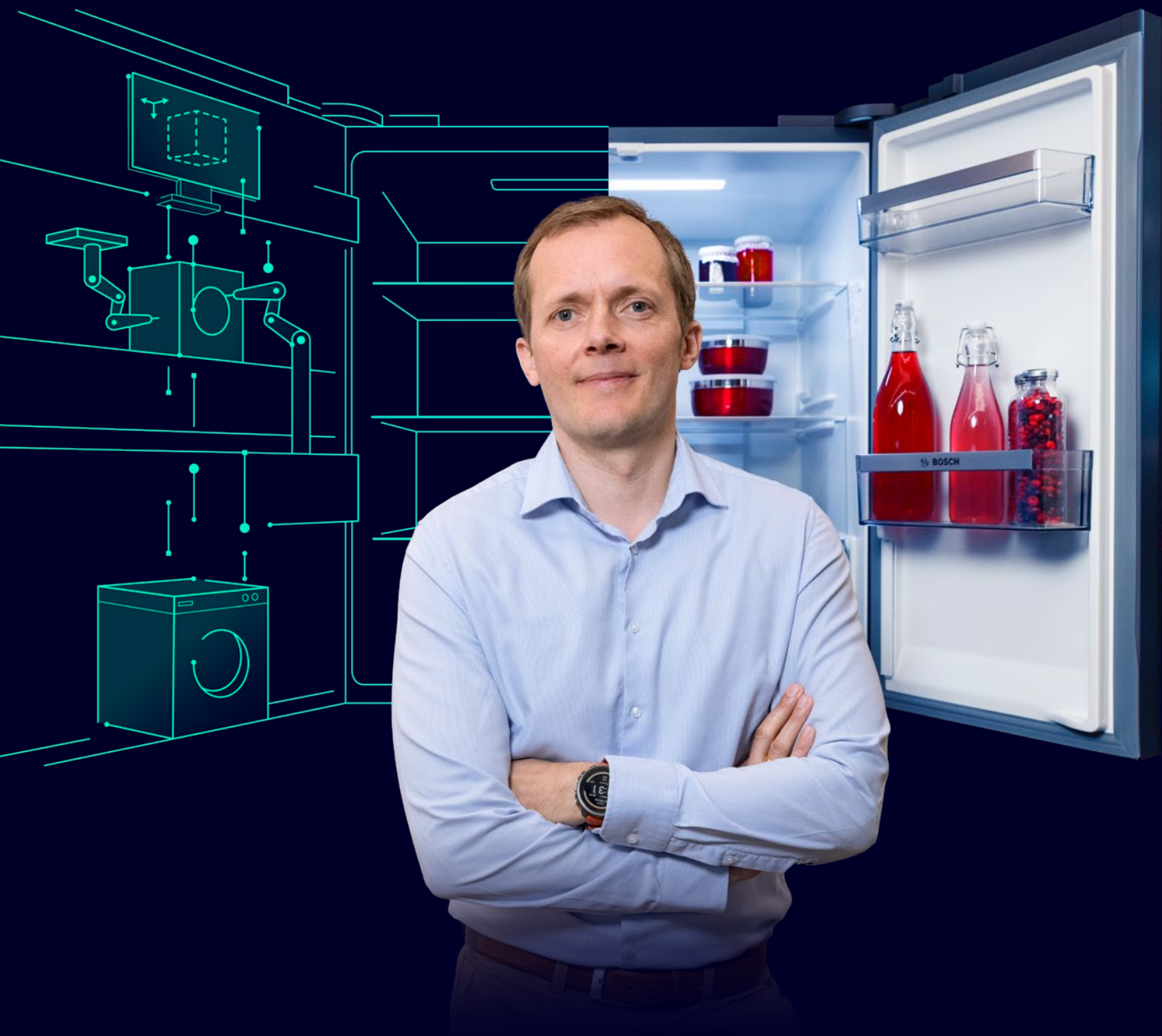




REFERENCE

**BSH unlocks the power
of data to accelerate
the journey from design
to manufacturing**

SIEMENS

siemens.com/bsh

B/S/H/



BSH Home Appliances Group, with a total turnover of some EUR 15 billion and more than 56,000 employees in 2025, is a global leader in the home appliance industry. The company's brand portfolio includes global appliance brands like Bosch, Siemens and Gaggenau, as well as regional brands, such as Neff and Thermador. BSH produces at 37 factories and is represented in some 50 countries. BSH is a Bosch Group company.



In a fast-paced global marketplace, speed and adaptability are the ultimate competitive advantages. By transforming into a true Digital Enterprise, BSH Home Appliances Group (BSH) has bridged the traditional gap between product development and shop-floor execution. Facing intense competition and rapidly changing rules and regulations, the company leverages a unified digital data backbone to turn operational complexity into streamlined efficiency, ultimately delivering high-quality home appliances to global consumers faster than ever before.

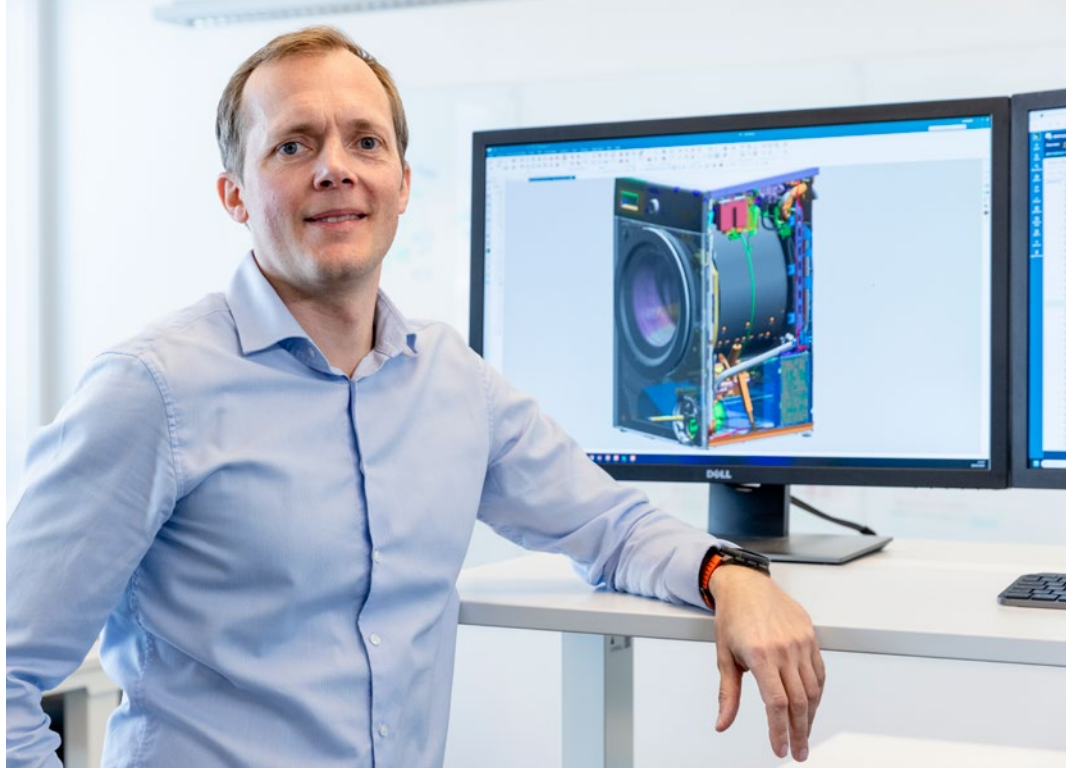
Mastering complexity: BSH's blueprints for the seamless digital factory

To conquer the complexity of managing thousands of product variants across five categories, BSH partnered with Siemens to build a fully digitalized value chain. Thanks to a unified single digital data backbone powered by Siemens Teamcenter, BSH eliminated legacy engineering silos and shifted from manual data handoffs to parallel, cross-disciplinary development.

Integrating PLM, MES, and ERP systems creates a comprehensive Digital Twin that harmonizes design and shop-floor execution. This ensures that when an engineer changes a part on his/her screen, the factory floor knows about it instantly, while simulation software and generative AI help to optimize global manufacturing workflows. The digital transformation has delivered massive efficiency gains, boosting engineering productivity by up to 30% and accelerating time-to-market by up to 50%.



A single data backbone allows BSH to connect product development and production, enabling the company to deliver high-quality products to consumers more quickly and efficiently.



We have to launch products even faster than before, and that means our strategy for digitalization includes having the data that is needed to manufacture our products in one digital backbone.”

Frank Helmke, Head of Product Lifecycle Management at BSH

One massive operation, thousands of variants

Imagine being one of the world’s largest home appliance manufacturers with well-known home appliance brands like Bosch, Gaggenau and Neff. Now, imagine producing thousands of product variants on the production lines. Then add five product categories, sustainability considerations, increasingly connected products, shorter innovation cycles, and increasing global competition. The result is complexity. BSH manages this complexity by operating as a Digital Enterprise. They transform complexity into speed, efficiency, and

productivity by closing the gap between product and production.

Their secret to success is data consistency, from product definition and development to manufacturing and product support. One central platform – Teamcenter from Siemens – provides the rock-solid foundation. Additionally, BSH uses many other products and solutions from the Siemens Xcelerator portfolio. This fully digitalized value chain solves BSH’s biggest market challenges of speed and flexibility.



Bridging the engineering gap: How BSH moved beyond manual data exchange

Like most manufacturers, BSH started its digitalization journey with individual solutions. These solutions included product data management, product configuration and product structure management, product cost management, with manufacturing engineering functions such as line balancing, variant management, and workplace analysis for optimal ergonomics. Teamcenter served as a data repository for document management and the assembly sequences. Solutions were digital, but not yet fully integrated.

Back then, product development and manufacturing engineering often worked on joint projects. The main difference was that they

did not use a common data storage system. In practice, a manufacturing engineer had to contact a product development colleague and request certain information, which would then be sent manually. Frank explains, "It was like this. I would say, 'Hey, Joe. Could you help me out and pass me the newest version of your sub-assembly and the product structure you're working on?' He would say, 'Maybe next week I'll have some time. We're pretty overloaded on our project.' That's how we used to work. I've been there myself." With several dozen factories around the world and short product release cycles, this was tedious and inefficient.



Our success comes from looking not only at the PLM processes – from requirements to the finished product – but also from our strong integration with the ERP system and our manufacturing execution system in our factories. This has been at the heart of our strategy.”

Frank Helmke,
Head of Product Lifecycle Management at BSH



Goodbye silos, hello speed: The seamless factory of the future

This situation has changed since BSH started its digitalization journey. As a long-term Siemens partner, BSH adopted Siemens’ integration strategy and gradually merged the product and production lifecycles with a fully digital tool chain. Frank Helmke manages all of these engineering software applications. His team is responsible for mechanical design, hardware development, electronics hardware, and software development.

In the past, BSH relied on spreadsheet software and isolated standalone solutions. Today, all BSH locations use a single Teamcenter instance. This system hosts all data, from requirements management to manufacturing engineering. The MES system and the ERP solution, SAP, are both connected to Teamcenter.

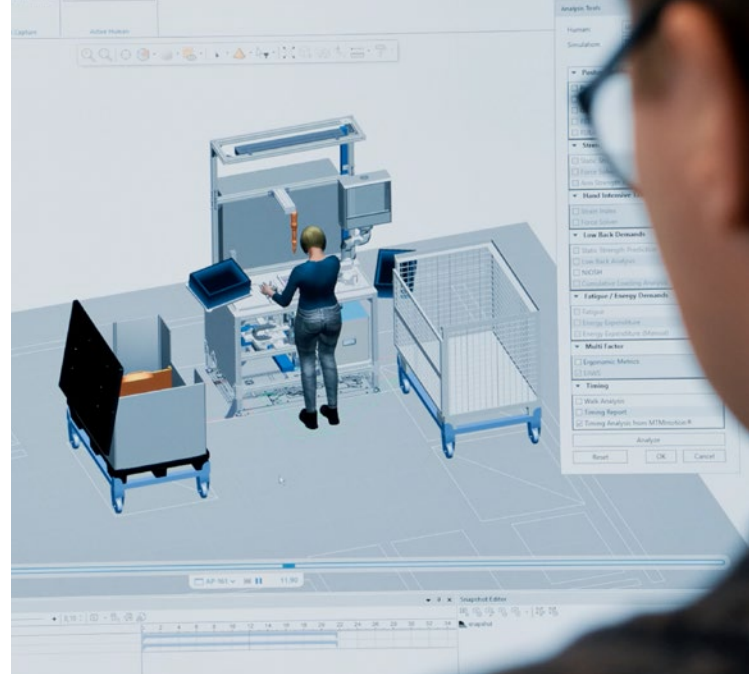
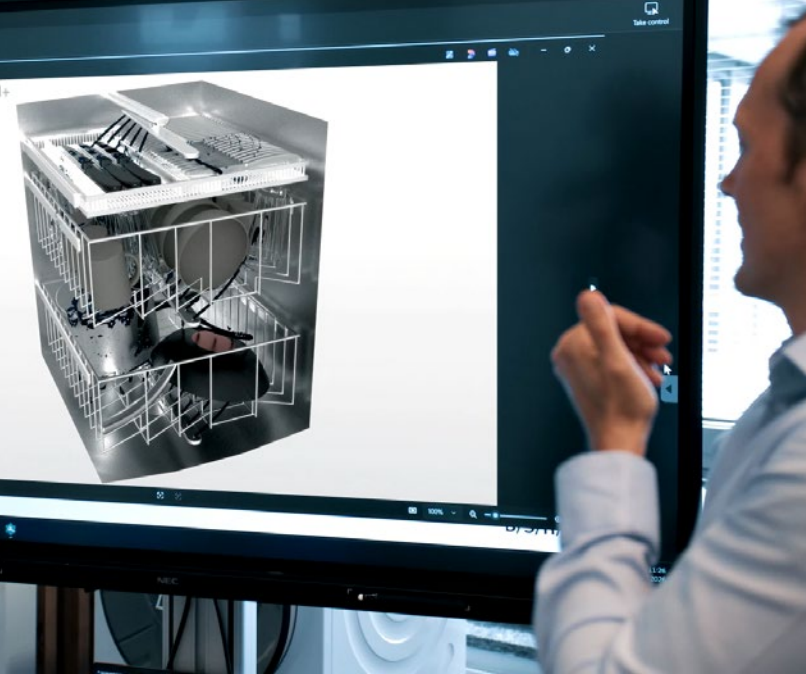
BSH aims to navigate global regulations with a single data backbone

Thanks to the unified data platform, manufacturing has access to all the relevant information it needs from product development to design a new assembly line for a new product within the same software environment. This is even more important today since most of BSH's products are software-defined products.

The heart of BSH's approach:
Connecting product development
and manufacturing with Teamcenter
as the single data backbone.

Having all data accessible on a single platform accelerates not only product development but also manufacturing. It's also crucial for meeting increasingly stringent and ever-changing market requirements. As a company active in many different markets such as North America, Europe, India, and Asia, BSH successively increases data transparency, which facilitates monitoring and documentation – supported by relevant data being stored in Teamcenter.





In product development, BSH uses software such as Simcenter STAR-CCM+ to simulate products and validate that they meet requirements. Tools like Tecnomatix Plant Simulation and Process Simulate help to optimize production.

From complexity to consistency: The power of a fully digitalized value chain

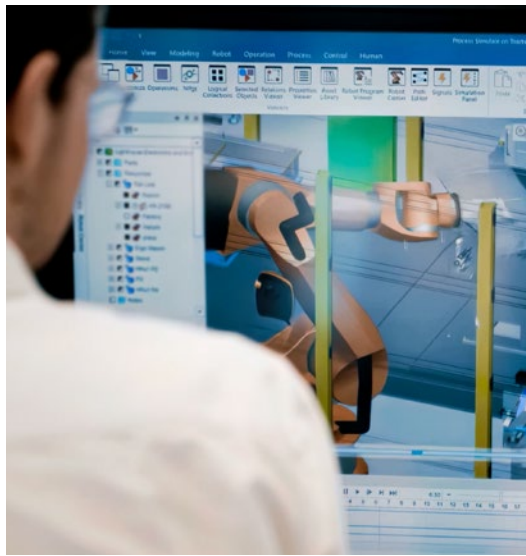
BSH aims to bring new product variants to market faster. Everything starts with consumer requirements' coming from the marketing department. These requirements are managed in Polarion from Siemens and then transferred to Teamcenter, where the requirements objects and their specifications are created. Product configuration allows BSH to drill down from thousands of variants to each specific single product type.

This data is also reused, for example for test cases, which are sent to Opcenter RD&L, Siemens' lab management solution, for validation. A physical test or simulation with for example Simcenter STAR-CCM+ software is then executed to determine whether the requirement is met. The results are sent back to Teamcenter and made available to all factories, saving time and effort across the organization.



Data consistency is more critical today than ever before. We are not only combining our engineering data; we are also producing connected, online home appliances, so the process extends the entire value stream from start to finish.”

Frank Helmke,
Head of Product Lifecycle Management
at BSH



Software-driven products: Where data consistency is mandatory

Here's a simple example of a software-driven product: After the firmware for a washing machine is developed, it's released in Teamcenter. From there, it goes all the way down the value stream to manufacturing engineering. Then, it's passed over to the manufacturing execution system.

Finally, at the end of the assembly line, the firmware is flashed onto the appliance. The firmware must be consistent and accurate to fit the product. Otherwise, it won't work. Seamless data consistency and a single data backbone ensure that it does. Always.



All software tools, such as those used for engineering, simulation, and production planning, access relevant data via Teamcenter.



Our engineers must focus on designing the right product in the best possible way. We help them do so with a state-of-the-art tool chain.”

Frank Helmke, Head of Product Lifecycle Management at BSH

Simulate, validate, optimize: Accelerating product development from a single source

In product development, the mechanical, electrical, automation, and software engineering disciplines can work in parallel rather than sequentially. Siemens industrial software, including Designcenter™ NX™ software, Polarion, Xpedition, and Simcenter, uses data stored in Teamcenter to speed up the development phase. Teamcenter

contains the bill of materials (BOM) for the electronics hardware, coming from Siemens Xpedition, and also the product's firmware as well as other product-related data. All software tools can access data stored centrally in Teamcenter. This facilitates product development and production planning across all disciplines and factories.

One line, a thousand variants: How BSH masters mass customization

Most of the previous silos have already been removed, and nearly all of the data is now stored in Teamcenter. Some areas are still a work in progress, though. Soon, the design bill of materials (DBOM) and the engineering bill of materials (EBOM) will likely be fully managed by Teamcenter. Then, deriving the manufacturing bill of materials (MBOM) and reducing the number of available product parts from 150% to 100% will be even easier. "For example, when developing new home appliances, we start with a few variants that should cover the basic requirements we know of. Then, we develop accordingly," Frank explains. "But then this is split into several hundred more specific variants. This has to be managed. It all comes down to the bill of materials, enterprise bill of materials management, and product configuration."

During the manufacturing engineering phase, BSH uses Teamcenter Easy Plan to create the bill of process (BOP) and Tecnomatix Process Simulate and Tecnomatix

Plant Simulation to simulate and validate the manufacturing concept. These results are also stored in Teamcenter.

"Our factories used to run their own processes that were completely tailored to their situation. They had their own development and engineering departments," Frank says. "By providing a central digitalization strategy, factories and development departments across different locations started working together globally and centrally, which tremendously impacted productivity."

Using the single data backbone and digital tool chain enables BSH to optimize productivity at all its factories worldwide. It allows all sites to quickly adapt to new product variants and changing market demands. Providing operators with the digital information they need on the workstation helps them improve productivity.



Operators at the lines are provided with up-to-date digital information about how to handle the number of product variants thanks to Teamcenter.



Philipp Winter, the Head of Digital Production Engineering at BSH, and his team use product development data for production planning and optimization. Teamcenter is their single source of truth.



An important step is combining the real with the digital world by bringing the Digital Twin together with what happens on the shop floor.”

Philipp Winter, the Head of Digital Production Engineering at BSH

The living blueprint: Mastering the value chain with the Digital Twin

For this to work, there must be seamless interaction between the PLM, MES, and ERP systems. Teamcenter and SAP exchange information millions of times per year. Countless work instructions and process parameters for each variant are sent from

Teamcenter to the MES system. Currently, BSH is working on closing the loop by bringing real-world data from the shop floor into Teamcenter to improve production planning.



Receiving the bill of materials and engineering data directly for production is tremendously beneficial.”

Philipp Winter, the Head of Digital Production Engineering at BSH

Standardization is the rule and software configuration is the necessary exception

“Receiving the bill of materials and engineering data directly for production is tremendously beneficial. It allows us to balance our lines, design the factory with the product in mind, and connect more with design for assembly and automation,” says Philipp. Integrating Teamcenter with MES allows manufacturing planners to compare planned data with actual production data, enabling them to optimize cycle times. The comprehensive bill of materials (BOM) is also synchronized with SAP.

“We want to improve the productivity of our production lines constantly. Therefore, we also need standard solutions that help us achieve those goals,” Philipp explains. That’s why seamless digital integration across the value chain relies heavily on standardization. However, it is possible to configure the software without creating new silos.

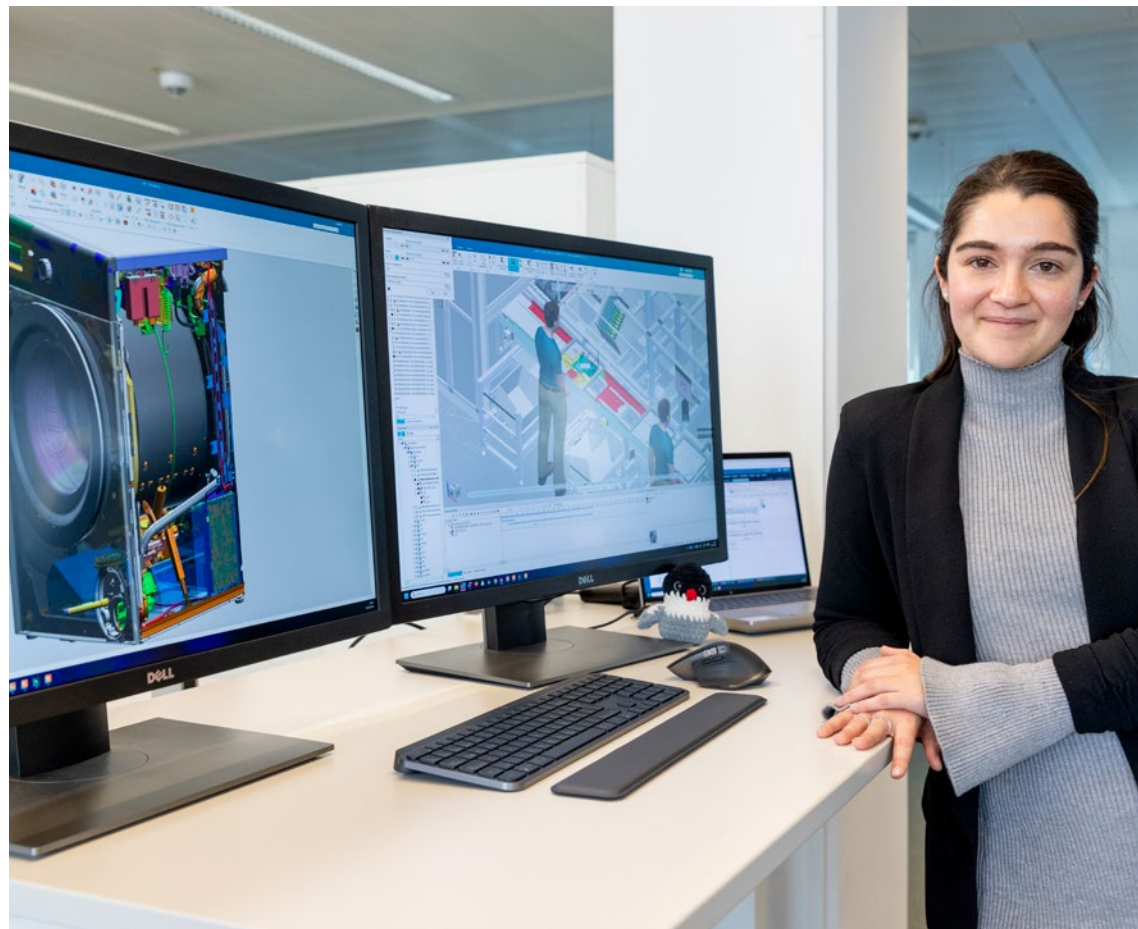
BSH integrates design, planning and production into a comprehensive Digital Twin

Because consistent data across the value chain is crucial, BSH uses a comprehensive Digital Twin from product development to production. The Digital Twin contains all relevant product information, including its parts and resources, engineering domains (mechanical, electrical, software, and automation), the machinery used to manufacture the product, and all other shipping data.

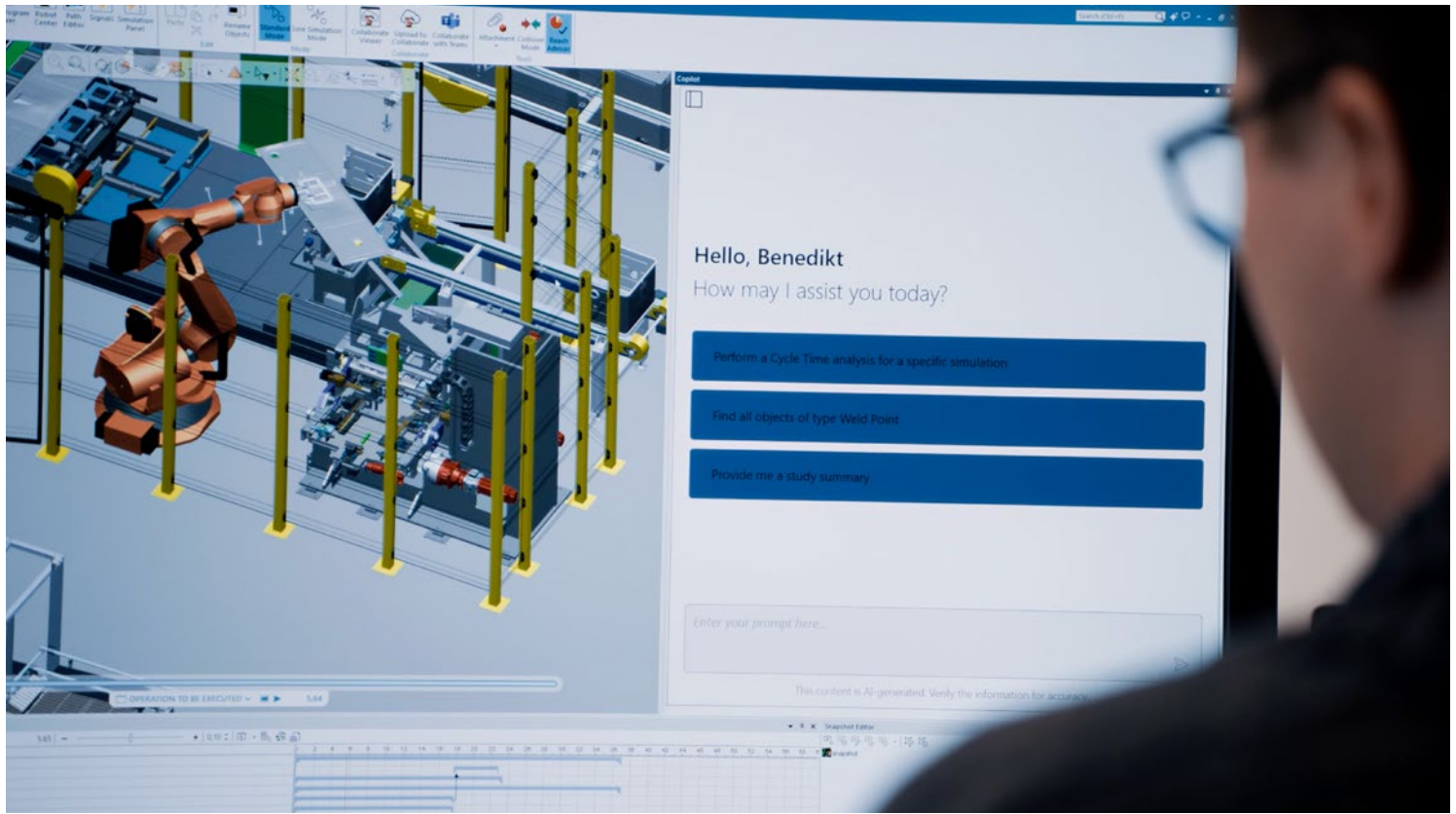
The Digital Twin is stored in Teamcenter and can be used with Siemens' simulation software to make continuous improvements. "We use a lot of downstream processes, such as Tecnomatix Plant Simulation and Process Simulate, for detailed analyses or for holistic simulations of entire value streams," says Philipp. For example, Process Simulate can be used for 3D manufacturing simulations to optimize production planning and validation, including the interaction between humans and robots.



BSH uses simulation software like Process Simulate to simulate manufacturing processes and the interaction between robots and humans, including ergonomics.



The comprehensive Digital Twin at BSH comprises product development and production.



Using the generative AI assistant in Process Simulate yields quicker results and allows non-experts to use the powerful simulation software.

The AI revolution: Turning complex data into instant actionable insight

As an initial proof of concept, BSH leveraged the generative AI solution that was directly integrated into Process Simulate. BSH also expects AI to deliver significant value through advanced data analytics and the visualization of simulation results, enabling deeper insights and more informed decision-making.

The biggest advantage is that the AI in Process Simulate understands natural language, so even non-experts without simulation knowledge can use the system and quickly obtain reliable results. BSH plans to integrate more AI solutions directly at the machines and lines on the shop floor.



AI will help us to
better understand our data
and to work faster.”

**Philipp Winter, the Head of
Digital Production Engineering at BSH**

BSH aims to use AI to achieve even greater efficiency, speed up the validation process, and quickly set up simulations. "The foundation will always be clean, clear processes and reliable, consistent data. If we use a large language model and input the vast amount of data in our database, we will reap significant benefits," Frank explains. As a prerequisite for integrating AI-based solutions that will automate engineering tasks, machine tool teaching, and line balancing, BSH will

continue to standardize and harmonize data across the organization. "AI can support visualization and advanced data analytics to produce better results from existing simulations," Philipp says. "The next big step for us is taking a more cross-platform approach to analytics for closed-loop manufacturing and agentic AI." One of his goals is to integrate AI directly into existing solutions to help users optimize their work, automate tedious tasks, and work faster.

BSH plans to use more AI solutions in the future. To lay the foundation, the company is further standardizing and harmonizing data across the organization.





Up to +30%
engineering productivity



Up to -50%
time to market possible



Up to 100%
seamless data flow across the value chain

The payoff: up to 30% more productive, up to 50% faster to market, up to 100% data consistency

BSH's digital transformation has paid off. Since implementing Teamcenter and connecting all trades and factories seamlessly with up to 100% of data consistency, engineering productivity has increased by up to 30%, and time to market has been cut considerably. Overall, BSH has accelerated its processes and increased flexibility and adaptability thanks to a seamless flow of data.

The successful digital transformation journey of BSH is also inspiring other companies. Frank says, "The aerospace and automotive industries, for example, face similar challenges and goals. When we talk to other companies and colleagues, we realize, 'Hey, what we did at BSH in recent years was actually really good.' That's when it starts to become fun."

From the cloud to the machine: Seamlessly scaling global intelligence

The journey doesn't end there. BSH is analyzing the use of Teamcenter X in a cloud environment to deploy new capabilities even faster. In order to make the most of the data available throughout the organization, Frank's and Philipp's teams are constantly

working to improve its quality.

Frank explains, "If we transition to the cloud or adopt a software-as-a-service solution, we hope to streamline our setup and maximize the benefits of what Siemens is delivering."

Partners in progress: The journey to becoming a Digital Enterprise

Siemens has been a strategic partner of BSH since the company started its digital transformation over a decade ago. The two companies have collaborated to improve existing solutions, with BSH benefiting from the latest additions to the Siemens Xcelerator portfolio and Siemens benefiting from real-world feedback and suggestions for its solutions from a global leader in home appliances.



Siemens understands our requirements, supports us with the right tools and industry knowledge, and is a long-term partner with whom we can work to optimize our development process."

says Philipp



Frank adds

"I really enjoy working with Siemens. You have to have a good relationship with each other to be successful together. We will definitely continue our digitalization journey with Siemens as our strategic partner to ensure that we have the best possible tool chain in place and that our consumers are happy."

**Published by
Siemens AG**

Digital Industries
Gleiwitzer Str. 555
90475 Nuremberg, Germany

**For the U.S. published by
Siemens Industry Inc.**

100 Technology Drive
Alpharetta, GA 30005
United States

© Siemens 2026

Support: Please direct any questions in connection with this White Paper to your Siemens contact person at your representative/sales office.

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.