



# Digital Twin as the best solution for your business

Modeling and simulation to design, optimize and monitor devices, systems and processes.







## THE PATH TO A FLEXIBLE, EFFICIENT AND EFFECTIVE PRODUCTION

Have you ever thought about redesigning your product to make it more efficient or to **improve innovation**?

Smart product, smart factory, everything is moving faster towards new contexts and products. Whether it's a machine or a product, the innovation is essential if you want to keep up with market demand.

More informed and interconnected customers also means increasingly sophisticated products. The stimulus is to continue to grow in quality and performance to be able to meet their needs and be the first or the best to do so.

This translates into **constant research and development** of new features and the need for testing and experimentation. For this reason, today **simulation** plays an increasingly important role within companies.

The race towards **more efficient production**, with higher quality and less time is a must. For many companies, product complexity is rapidly increasing and is significantly changing conventional development and management techniques. Inevitably, the associated costs for design and maintenance (physical prototyping, physical testing) are bound to increase faster and faster.

Throughout the industrial world, a series of initiatives respond to these issues, being focused on the goal of sustainability. Digital technologies are one of the essential tools to address these challenges.

**Dofware offers modeling and simulation to promote digital evolution and the competitiveness of companies.**

## THE DIGITAL TWIN TO IMPROVE YOUR PRODUCTS

For Dofware, **System Engineering, Model-Based Design and Simulation** are the enabling factors for industrial development and innovation.

Modeling and digitally simulating a product are among the best actions to adequately address the challenge of complexity.

**Dofware builds mathematical models (Digital Twin) that simulate the product operation:** a car, a chemical plant, an airplane, an appliance, a machine or a single component.

Our experts can simulate various operating conditions of a system, reaching accurate levels of fidelity with calculation times that were previously unthinkable.

Machine Learning, Physical Modeling or a Hybrid Solution? Using one or the other technique is for us a choice guided by the objectives, the type of problem and the information available.

More and more efficient communication systems allow the **continuous exchange of information between the real system and its Digital Twin.**

The **IOT platforms** can integrate our co-simulation solutions (DT-Orchestrators who manage federations of Digital Twins that communicate with each other) with the real system and with the company's management systems.

The virtual product is useful, for different purposes, throughout its life cycle. It facilitates the **design**, the usability and the interaction with other systems. Its value is to reproduce the physical work in a virtual environment and to **predict the future condition of the real asset.**

Doing **tests**, knowing in advance the behavior of the product or of some components and validating the control systems using realistic models from the design phase allows not to give up on innovation and, at the same time, to save costs, resources and time.

While simulating a real product helps to **increase knowledge.** Knowing the strengths and weaknesses of products is the fundamental requirement to improve them.

The **Digital Twin** helps to collect all knowledge about the product and make it available to those who have to make decisions about its usability, functionalities, its design.

The virtual product offers many benefits and there are many success stories that point the way forward.

Dofware, which has always been committed to promoting the adoption of modeling and simulation-oriented solutions, proposes an approach based on the following aspects:

### METHODOLOGY

Model Based System Engineering (**MBSE**) is one of the methodologies we use on our projects and provide to our customers.

### STANDARDIZATION

We select and use open and reusable standards (MODELICA, FMI, etc.)

### EXPERTISE

Our experts explore the most appropriate solution to meet a specific requirement. We can apply Machine Learning and Artificial Intelligence techniques (Data Driven), physical-mathematical modeling (Model Driven) or both.

### TOOLS

Dymola,  
OpenFOAM,  
Reqtify, Stimulus,  
Controlbuild,  
Autosarbuilder  
CTC++

The technologies that Dofware offer can be used through the 3DEXPERIENCE platform of Dassault Systèmes, that allows to manage all the information and the evolution of your product throughout all its life cycle, making extensive use of modeling and simulation.

The 3DEXPERIENCE brings together all the aspects of your business to give life and grow the Virtual Twin of your product.



## BETTER QUALITY FOR EVERYONE

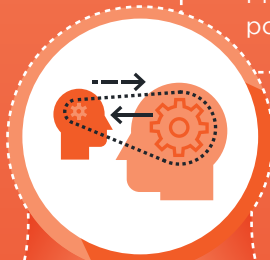
The introduction of these new technologies and methodologies brings benefits in terms of savings time and costs, better risk management both in the design phase and in the production and operating phases, forecast of the impacts due to changes (change management & impact analysis), with consequent increase in quality throughout the product life cycle and reduction in time-to-market.

# DIGITAL TWIN:

Catch e use the knowledge of your product

### RESEARCH & DEVELOPMENT

- ✓ More accurate design, reduction of the physical prototypes production, causing time and cost savings.
- ✓ Use of virtual prototypes to verify and validate the software component of the product.
- ✓ Prediction of the changes impact and of potential issues..



### PRODUCT OPERATION

- ✓ Optimization of energy consumption and raw material usage,
- ✓ Predictive maintenance and performance management by using real-time information.
- ✓ Staff training on virtual environments.



### SALES & MARKETING

- ✓ Distribution of the virtual prototype to improve customer experience
- ✓ Virtual product as the innovative item in the portfolio.
- ✓ Openness to new business models.



### ENABLING TECHNOLOGIES

Digital Twin, Virtual Sensors, Internet of Things (IoT) & Cloud, Digital Twin Orchestrator, Model Based System Engineering (MBSE), Behavioral Modeling&Simulation, Artificial Intelligence, Computational Fluid Dynamics (CFD) simulation, Surrogate Models, Modelica, Functional Mockup Interface (FMI)

### ENABLING SERVICES

Modeling&Simulation, Engineering Consulting, MBSE consulting, Behavioral Algorithms design, Numerical Algorithm design, Verification&Validation, Virtual Test Rigs, Technology Services, Cloud Services, Mobile Applications, Embedded Systems, Training

