Digital Modelling and Simulation for Design, Processing and Manufacturing of Advanced Materials

DiMAT

Stefanos Vrochidis
Project Coordinator
E-mail: stefanos@iti.gr

Information Technologies Institute, Centre for Research and Technology Hellas

CHALLENGE

Weak coupling between digital transformation and material science, leading to **limited material-driven innovation** in the manufacturing industry.

Limited benefit for SMEs due to **lack of computational research** departments and **costly computational tools**, highlighting the need for easy access solutions.

Need for standardised, traceable workflows and software interoperability in modeling and characterisation.

Promote competitiveness in European manufacturing by encouraging innovation and adopting sustainable processes.

OBJECTIVE

DiMAT Project will develop digital technologies for modelling, simulation, and optimisation at each stage of the material value chain (design, processing, and manufacturing) with data analysis services and visualisation techniques for enhancing quality, sustainability, efficiency, and competitiveness of materials.

DiMAT Suites will be offered to SMEs and Mid-Caps according to a cloud Software-as-a-Service (SaaS) paradigm, implementing a cost-effective way for companies to utilise.

DiMAT SUITES
is a complete package consisting of 9 DiMAT Toolkits

DiMAT Solutions for:
- Data and Assessment
- Modelling and Design
- Simulation and Optimisation

CONCEPT

DiMAT embraces a direct, proven, and efficient strategy that encompasses:

A need capturing phase: Benchmarking current technologies and identifying industry needs.

A design phase: Creating a detailed DiMAT Framework and Architecture addressing multiple perspectives.

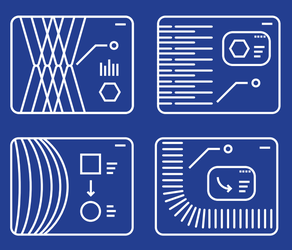
A build phase: Developing tools and technologies for data management and material behavior prediction across various suites.

A key evaluation phase: Ensuring real-world applicability, focusing on impact generation through dissemination and exploitation activities.

The DiMAT Architecture is based on the ISO/IEC/IEEE 42010 standard and the most common reference architectures in the manufacturing domain (e.g. IIRA, RAMI4.0, IDSA, and IMSA) and incorporates all fundamental viewpoints involved in the process: business, usage, functional and implementation.

DEMONSTRATION

The DiMAT Solutions will be demonstrated in 4 Pilots representing 4 very relevant material manufacturing sectors such as : Polymer, Composite, Glass and Graphite. The pilots will be implemented to show the applicability and impact of the project and its results into the market environment under real-world conditions.



Industrial Sectors and activities:
Synthetic Textiles Production (Polymers)
Advanced Composite Materials (Composites)
Innovative Glass Forming Process (Glass)
New Product Development Process (Graphite)

IMPACT

DiMAT aims to speed up the integration of digital technologies for material designers and producers, improving material quality, sustainability, efficiency, and competitiveness. By building on existing technologies and open-source software, DiMAT tools use AI-driven methods for sophisticated optimisation workflows in production processes and take advantage of proven semantic technologies for seamless interoperability.

DiMAT aims to enhance productivity, innovation, resilience, sustainability, and global competitiveness for EU material industries and manufacturing companies. By developing and implementing DiMAT toolkits, such as the Materials Environmental and Cost Life Cycle Assessment, the project supports the transition to a circular economy through cross-sector collaboration.

By developing digital tools, DiMAT empowers workers to improve their skills and stay current with emerging trends and technologies, ultimately elevating industry working conditions. The project also supports clean, eco-friendly processes that minimise the environmental footprint and advance decarbonisation efforts.

Co-funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under the Grant Agreement 101091496. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

Get in touch with DiMAT

www.dimat.eu
info@dimat-project.eu
dimat-project
@dimatproject