

ONE4ALL PROJECT

PERIODIC UPDATE ON OUR ACTIVITIES

ONE4ALL Project at MECSPE Fair in Bologna

In March 2025, CRIT took part in the MECSPE Fair in Bologna – one of the leading events for the manufacturing industry, which welcomed over 65,000 visitors in three days. With a dedicated booth, CRIT showcased the ONE4ALL project through flyers, a roll-up banner, and a video highlighting its key technologies and objectives.

As part of the initiative, CRIT also hosted an **open seminar** in collaboration with Innobotics, presenting the project’s innovations in automation and robotics. The event helped raise awareness of the project and provided an opportunity to engage with a wide audience of professionals and technology enthusiasts.



Figure 1: ONE4ALL booth and seminar at MECSPE Fair

Explore ONE4ALL Scientific Contributions on Zenodo

As part of its commitment to advancing research in smart manufacturing, the ONE4ALL consortium has published a series of **scientific papers now available on [Zenodo](#)**. These publications highlight key innovations developed within the project, covering topics such as digital twins, energy efficiency, human-centric process modelling, Industrial IoT security, and simulation model validation.

Each paper represents the collaborative work of leading academic and industrial partners in the consortium, aiming to support the transition toward more flexible, sustainable, and intelligent manufacturing systems.

[!\[\]\(339a16584d5da0f0a3ca4e9ec17bf6a1_img.jpg\) Discover with us the latest publications and visit the ONE4ALL Zenodo community to access and download the researches.](#)

"Data-driven extraction of simulation models for energy-oriented digital twins of manufacturing systems: an illustrative case study" by Atieh Khodadadi & Sanja Lazarova-Molnar

This paper explores how Energy-Oriented Digital Twins (EODTs) can help manufacturing systems optimize energy use without compromising productivity. Using real data from a drone assembly process, the authors show how digital twins can simulate energy behaviours, test "what-if" scenarios, and support better decision-making. It's a powerful glimpse into how data-driven tools can make manufacturing both efficient and sustainable.

"Discovering simulation models from labor-intensive manufacturing systems" by Götz Manuel & Sanja Lazarova-Molnar

Can simulation models truly reflect the human side of manufacturing? This paper dives into labour-intensive manufacturing systems (LIMSs)—like those in food or apparel industries—where human operators play a key role. The authors explore how to automatically create simulation models that don't just map processes but also account for human fatigue and its effects on performance. Using stochastic Petri nets, they propose a way to model these systems dynamically, paving the way for smart, adaptable Digital Twins that evolve with the workforce and production environment.

"On the adoption and deployment of secure and privacy-preserving IIoT in smart manufacturing: a comprehensive guide with recent advances" by Sani M. Abdullahi & Sanja Lazarova-Molnar

As smart manufacturing embraces the power of Industrial IoT (IIoT), it unlocks new levels of efficiency—but also exposes itself to serious cybersecurity risks. This paper tackles the growing complexity of securing interconnected IT and OT systems in modern factories. It offers a practical, in-depth guide to understanding current threats and implementing advanced defense mechanisms, without requiring deep technical expertise. With real-world insights and a robust security framework, the authors help manufacturers build safer, more resilient IIoT infrastructures—ensuring that progress doesn't come at the cost of privacy and security.

"Modular Validation within Digital Twins: A Case Study in Reliability Analysis of Manufacturing Systems" by Ashkan Zare & Sanja Lazarova-Molnar

Digital Twins are powerful tools for optimizing modern manufacturing—but only if they stay in sync with the real world. This paper tackles a key challenge: how to keep Digital Twins accurate when different parts of a system evolve at different speeds. The authors introduce a modular validation method that pinpoints which parts of a simulation model need updating, recalibrating, or can remain

unchanged. Using a case study focused on reliability analysis, the paper shows how this approach keeps Digital Twins sharp, relevant, and ready to support smarter decision-making on the factory floor.

"Multi-flow Process Mining for Comprehensive Simulation Model Discovery" by Atieh Khodadadi & Sanja Lazarova-Molnar

Traditional process mining is great for mapping how systems work—but what if you need a deeper, multi-dimensional view? This paper introduces *Multi-flow Process Mining (MFPM)*, a next-gen approach that goes beyond time and activity tracking to also capture energy use, waste, and carbon footprint. By using an extended form of Petri nets, the authors model complex system behaviors across multiple dimensions. The result? A richer, more holistic understanding of manufacturing processes that supports smarter, more sustainable decision-making. A detailed case study shows how MFPM works in practice, unlocking new possibilities for optimization.

Next Consortium gatherings

At the end of May, partners from the **ONE4ALL** and [DMAAST](#) projects will come together in Porto for a joint General Assembly—two days dedicated to sharing knowledge, aligning research directions, and strengthening collaboration across initiatives driving the future of manufacturing.

The agenda includes focused sessions on **intelligent platforms**, **AI applications**, and **decision support systems**, as well as a dedicated **Digital Twins workshop**. Beyond the technical sessions, the Assembly will foster active dialogue between projects—starting with joint introductions and a discussion on **synergies and overlaps** and concluding with a session on **shared communication strategies**.

A collaborative atmosphere, networking opportunities, and a group dinner will round off what promises to be a productive and engaging meeting.

Stay tuned for highlights and outcomes of the event!

[Want to know more about the project?](#)

More details on the project activities, results, consortium are available on the official website: <https://one4allproject.eu/>

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