



From Industry 4.0 to 5.0: Rethinking the Future of European Construction

For years, the construction sector has been under pressure to “modernise.” First came digitalisation, BIM, automation and data-driven planning under the banner of Industry 4.0. Now a new paradigm is emerging across Europe: Industry 5.0. And this shift is not just technological. It is cultural.

Industry 5.0 places the human being back at the centre of industrial transformation. It promotes a model that is not only efficient and competitive, but also sustainable and resilient. In the context of construction, this matters enormously.

Construction is one of the most resource-intensive sectors in Europe. It accounts for around 36% of CO₂ emissions and more than 35% of total EU waste generation. These figures are not marginal. They make construction one of the key battlegrounds for achieving the objectives of the European Green Deal and climate neutrality by 2050. As highlighted in the OASIS materials, the sector consumes vast amounts of raw materials and generates over a third of total waste in Europe.

Industry 5.0 responds to this reality by going beyond productivity and automation. It introduces a more human-centric and sustainable approach to innovation, asking three essential questions. How can we reduce environmental impact at every stage of the building lifecycle, from design to demolition. How can we design systems that are resilient to climate shocks and resource scarcity, ensuring long-term sustainability. And how can we ensure that workers are empowered, upskilled, and supported rather than replaced by technology.



In construction, this translates into very concrete transformations.

First, digital tools such as BIM, digital twins and AI-based energy modelling are no longer used only to optimise costs and timelines. They are increasingly applied to simulate energy performance, reduce material waste and plan circular building solutions.

Second, resilience is becoming a design principle. Extreme heatwaves, flooding and water scarcity are no longer abstract risks. The Energy Performance of Buildings Directive requires new buildings to move towards zero-emission standards and pushes for deep renovation of existing stock. This creates a structural demand for new competences: insulation technologies, renewable integration, smart energy systems and adaptive design.

Third, and perhaps most importantly, Industry 5.0 redefines the role of workers. Automation can support tasks on site, but the transition to sustainable construction depends on human judgement, problem-solving and ethical responsibility. Choosing low-impact materials, applying circular principles, managing waste flows and integrating nature-based solutions are decisions that require trained professionals, not just machines.





This is where the gap becomes visible. Many small and medium-sized construction companies struggle to keep pace with evolving regulations, green standards and technological innovation. As noted in the OASIS framework document, there is still a significant distance between policy ambitions and the practical skills available on site. Industry 5.0 will remain a concept unless it is translated into updated training systems and real upskilling opportunities.

The transformation also has a social dimension. The construction workforce is ageing in many European countries. At the same time, young people often perceive the sector as traditional and not particularly innovative. Embedding Industry 5.0 principles into vocational education can help reposition construction as a high-tech, sustainability-driven and socially meaningful career path.



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In this sense, Industry 5.0 is not about replacing bricks with algorithms. It is about aligning technology, environmental responsibility and human competence into a coherent model of development. It means designing buildings that emit less, waste less and last longer. It means empowering workers with green and digital skills. And it means creating companies that are not only competitive, but also accountable to society and the planet.

This is precisely the space in which the OASIS project operates. By developing blended learning paths, real case studies and structured green skills training aligned with European frameworks, OASIS translates the vision of Industry 5.0 into practical tools for vocational education and training. It bridges the gap between European legislation, such as the EPBD, and everyday practice on construction sites. In doing so, OASIS does not treat Industry 5.0 as an abstract strategy. It turns it into a lived experience for students, trainers and companies across Europe, ensuring that the future of construction is not only smarter, but genuinely sustainable and human-centred.

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