

Fact sheet/ WP2: Technological and Economic Development and Foresight

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Digital transformation in European steel industry: state of art and future scenario

- Digital transformation in European steel industry
- Technological transformation and EU climate objectives
- Digital technologies in supporting the social innovation
- Benefits, barriers and drivers

DIGITAL TRANSFORMATION IN THE EUROPEAN STEEL INDUSTRY

Digital transformation → the key enabler directly impacting on advanced manufacturing and transversally affecting the pathway towards sustainability.

The digital transformation in the steel production → increasing the **production efficiency** and **sustainability** to reduce the industrial environmental impact, through:

- advanced tools for the optimization of the whole production chain
- enabling the implementation of green technologies for low-carbon production.

The successful implementation of **new technologies** strongly depends on the human perspective in a context of social innovation.

Social innovation: upskilled workforce, changes in attitude and behaviours supported by digital technologies by improving working conditions and safety, new qualified jobs, enhancement of the workers' competencies.

Digital innovation can enable and support the social innovation process, facilitating knowledge sharing, cooperative work and networking.

TECHNOLOGICAL TRANSFORMATION AND EU CLIMATE OBJECTIVES

Digitization: a key component of the technological transformation of the Energy Intensive Industries to reach the EU climate objectives, according to **the European Green Deal** for the EU and its citizens, which aims at:

- achieving the complete reduction of GHGs by 2050 and transforming society, including a modern, resource-efficient and competitive economy, through a Circular Economy model.
- setting the transition to a sustainable economy by identifying instruments to achieve its Zero Carbon ambitions.

Digital technologies as enabler of green technologies are defined by:

- the **Green Steel for Europe** project: developing an innovative approach, combining the assessment of promising technologies, industrial transformation scenarios, and policy options and impacts to face the decarbonisation of the European steel industry.
- the **Clean Steel Partnership (CSP)**: with its roadmap defines the R&D&I activities for a sustainable production. Digitalisation, as enabler, is one of the six areas of intervention comprising different technological pathways with the target of a carbon-neutral steel production. The CSP roadmap also defines the specific contribution of the digital technologies to develop different green performances.

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DIGITAL TECHNOLOGIES IN SUPPORTING THE SOCIAL INNOVATION

- The continuous monitoring and control of processes, through process automation, robotization of operations to prevent contact with dangerous substances, fires and explosions, accidents at work, release heavy burdens, etc.
- Releasing workers from process malfunctions, unexpected events, or accidents.

Industry 5.0 harmonizes with the paradigm of Industry 4.0 through research and innovation and the transition towards a sustainable, human-centric and resilient European industry, integrating social and environmental priorities into technological innovation through a systemic approach:

- Individualised Human-machine-interaction;
- Bio-inspired technologies and smart materials;
- Digital twins and simulation;
- Data transmission, storage, and analysis technologies;
- Artificial Intelligence;
- Technologies for energy efficiency, renewables, storage and autonomy.

Positive view: relieving humans from monotonous and physically strenuous work to be replaced with creative work.

Negative view: increase of unemployment and wide-spread workforce de-skilling.

BENEFITS, BARRIERS AND DRIVERS

The digital technologies are generally applied in all the company’s areas, especially in the process chain control and where the management of large amounts of data is required (i.e., production, business, etc.).

Expected **benefits**:

- production (i.e., cost reduction and quality improvement),
- positive impact on workforce in terms of safer and healthier workplaces,
- environmental improvements (i.e., reduction of wastes, emissions, and re-sources consumptions).

Main **barriers**:

- cost of the investment (due to obsolescence of plant/infrastructures and equipment)
- the lack of highly skilled workforce
- skills gap
- acceptance of the new technologies by the workforce.

Main **drivers** for industrial innovation:

- digital transformation
- climate change.
 - digital technologies help to increasing energy and resource efficiency
 - digital technologies contribute keeping materials in use for a longer time.
- synergies between the different EU initiatives
 - support companies in their digital transformation and CE.
- Industry 5.0
 - will enhance the skills of workers
 - attraction and retention of talented people
 - improving companies’ competitiveness.