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European Steel Skills Agenda (ESSA)

What's New?

Technological developments in the European steel industry

The current state of the digital transformation of the European Steel Industry has been assessed by considering the topics related to Technological and Economic Development and Foresight,.

The technological and economic developments and trends have been analysed jointly with the effects of digitalization on the steel industry workforce.

Digital transformation in European Steel Industry: state-of-art

- The European steel industry is evolving towards industry 4.0 through the progressive application of the Key Enabling Technologies (KETs) represented by new generation of sensors, Big Data, Machine Learning, Artificial Intelligence (AI), Internet-of-Things (IoT), Internet-of-Services, Mechatronics and Advanced Robotics, Cloud Computing, Cybersecurity, Additive Manufacturing, Digital Twins, Predictive Maintenance.

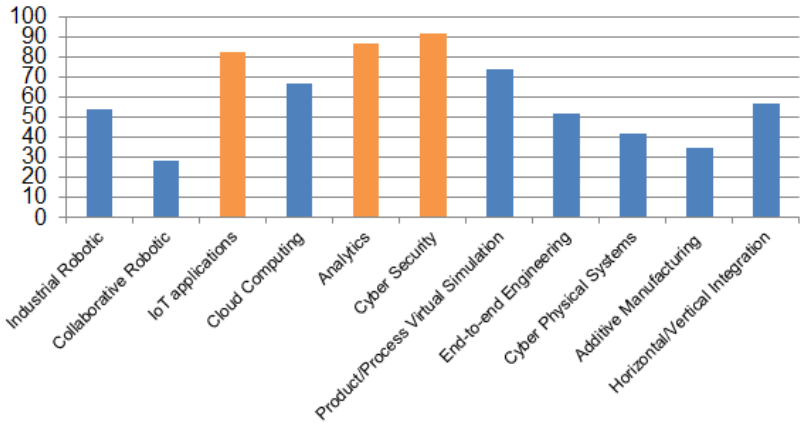

Figure 1: Ranking of planned investment in Steel Industry within short time (Source: Survey among European Steel Companies)

- The planned investments in almost all the I4.0 technologies within short time (i.e. 3 years) show great interest and knowledge of KETs, especially on IoT applications, Analytics and Cybersecurity as evidenced by the Fig.1 related to the survey addressed to European steel companies.

- Digitalisation is widespread 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. (Figure 2). Other areas, such as maintenance, administration, quality control and HR management, immediately follow in this ranking.

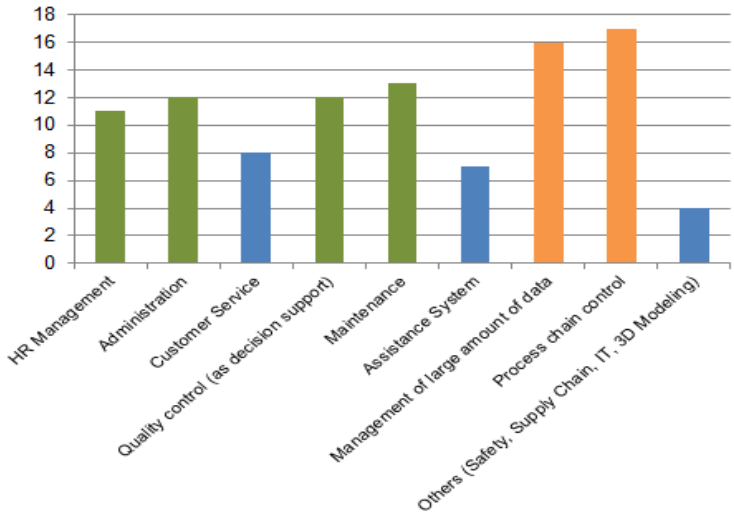

Figure 2- Areas interested by digitalisation applications within the European Steel Companies time (Source: Survey among European Steel Companies)

Upcoming technological and economic developments

- The challenge of digitalization focuses on the integration of all systems (sensors, automation, and IT systems) and productions units in different dimensions (horizontal, vertical, transversal, life-cycle).
- Digitalization trends are oriented towards adaptive online control, through-process optimization, through-process synchronization of data, zero-defect manufacturing, traceability, intelligent and integrated manufacturing.
- Knowledge (Data and Human expertise) Management is a key factor in order to maximize the opportunities coming from digitalization through new knowledge-based approaches (i.e. knowledge-based decision support system).
- The most important economic factors, following the technological applications, concern: reduction of energy and raw material consumption, lower operational expenditure (OPEX), reduction of losses, increased product quality and productivity, improved flexibility and the reliability of processes.
- New business models & organizational structure are foreseen for a stronger networking between business processes, creation of efficient interfaces, integrated data exchange and management.
- Environmental benefits are expected from the monitoring and the assessing of the environmental performance of processes by combining digital and CO2 mitigation technologies, such as Carbon Direct Avoidance (CDA), Process Integration (PI) and Carbon Capture, Storage and Usage (CCU).

Impact on Steel Industry workforce and VET system

- Soft-skills as collaboration, communication and autonomy are required in order to be able to carry out jobs in hybrid operating systems. Workforce should increase its ability to be adaptable and to get into the habit of continuous learning in an interdisciplinary perspective.
- Continuous training activities and updated programs represent the key aspects for the steel companies in order to achieve a successful future and to improve the interdisciplinary skills.

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Coming events

ESTEP Workshop

Impact and opportunities of Artificial Intelligence techniques in the Steel Industry

Links of interest

- Steel sector Careers: https://op.europa.eu/it/publication-detail/-/publication/a9ebd140-2255-11ea-af81-01aa75ed71a1/language-it/format-PDF
- "The Challenge of Digitalization in the Steel Sector": https://www.mdpi.com/2075-4701/10/2/288/pdf

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