

Sustainable and Intelligent Manufacturing: Perceptions in line with 2030 Agenda of Sustainable Development

J. Paulo Davim

This editorial presents insights into sustainable and intelligent manufacturing in line with the 2030 agenda for sustainable development. It begins by framing the concept of sustainable development and its objectives within the scope of the 2030 agenda. Then it explains the concept of sustainable and intelligent manufacturing in agreement with the latest developments in the industry. It finishes by envisioning the integration of Industry 5.0 in the 2030 agenda.

DOI: [10.15376/biores.19.1.4-5](https://doi.org/10.15376/biores.19.1.4-5)

Keywords: *Sustainable development; Sustainable and Intelligent Manufacturing; Industry 5.0*

Contact information: *Department of Mechanical Engineering, University of Aveiro, Campus Santiago, 3810-193 Aveiro, PORTUGAL; mailto: pdavim@ua.pt*

Currently, most advanced countries are in agreement that the sustainable development model must be the solution to be adopted by humanity. In 1987, the concept of sustainable development was presented in the World Commission Environment and Development (WCED) report, known as the Brundtland Report, entitled “*Our common future*”. It is a multidisciplinary concept, still used today, with the following most common definition: “*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*”. Namely, “*it enables people, now and in the future, to achieve a satisfactory level of social and economic development and human and cultural fulfillment, while making reasonable use of the Earth’s resources and preserving species and natural habitats*” (Brundtland 1987). This concept, of great importance, establishes connections between the three fundamental pillars, namely, the economic, social and environmental aspects. It is an intricate concept because it includes diverse goals and expectations that are very difficult to fully achieve.

In 2015, at the headquarters of the United Nations, at the Post-2015 Sustainable Development Summit, 193 world leaders agreed on the 2030 Agenda, which integrates the 17 sustainable development goals (SDGs) (ONU 2023). These include not only concerns about water and the environment, but also other objectives such as improving health, reducing poverty and hunger, as well as addressing gender inequality. These objectives are part of the three dimensions of sustainable development: economic, social, and environmental. The commitments of the 2030 Agenda are present, on issues of great importance for humanity, such as the search for *prosperity, peace, and partnerships* with the aim of preserving *people* and the *planet* (5P).

Thus, economic development of modern societies involves industrial development. Namely, the manufacturing sector transforms raw materials into increasingly sophisticated, high-tech products with great added value. In this way, the economic success of a country increasingly depends on the development and robustness of its production sector. This is consistent with the great attention that more industrialized countries dedicate to this sector. The industries of these countries concentrating to regulating activities in the manufacturing

sector with social and environmental impact. Therefore, it is evident that industries must consider, in addition to the economic dimension, the social and the environmental dimensions (Leahu-Aluas 2010).

According to the US Department of Commerce, sustainable manufacturing is defined “*as the creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers and are economically sound*” (Moldavska and Welo 2017). In other words, environmentally correct processes are being used, always with the concern of maintaining the economic aspect at competitive levels, but where sustainable manufacturing involves the manufacture of products that can be recycled or reused (Leahu-Aluas 2010, Davim 2010).

Recently, a strategic high-tech project, called “Industry 4.0”, was launched in Europe; it promotes the computerization of manufacturing. Following this, advanced industrial manufacturing that use informatics to automate production using artificial intelligence and its interaction with human beings, together with sustainable technologies and materials, are of the utmost importance in the policy and strategy to be developed in the near future, within the scope of “Industry 5.0” (Machado and Davim 2023). The philosophy behind this concept is now beginning to be implemented, in line with the 2030 Agenda, namely, SDGs 8 (decent work and economic growth), 9 (industry, innovation, and infrastructure) and 12 (responsible consumption and production).

References Cited

- Brundtland, G. H. (1987). “Our common future,” Brussels, Belgium: Word Commission on Environment & Development-Report.
- Davim, J. P. (ed) (2010). *Sustainable Manufacturing*, Wiley, ISBN 978-1-84821-212-1
- Leahu-Aluas, S. (2010). Sustainable manufacturing – An overview for manufacturing engineers, Sustainable Manufacturing Consulting, Indianapolis, US, Technical paper.
- Machado, C., and Davim, J. P. (eds) (2023). *Industry 5.0: Creative and Innovative Organizations*, Springer, ISBN 978-3-031-26231-9
- Moldavska, A., and Welo, T. (2017). “The concept of sustainable manufacturing and its definitions: A content-analysis based literature review,” *Journal of Cleaner Production* 166, 744-755. DOI: 10.1016/j.jclepro.2017.08.006
- ONU, Transforming our world: the 2030 Agenda for Sustainable Development, Department of Economic and Social Affairs, Sustainable Development, <https://sdgs.un.org/2030agenda> (accessed on 2023)