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# Call for papers – Special Issue

## Artificial Intelligence and Sustainability

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The consideration and the importance of sustainability is no longer to be proven today in the competitive landscape, whatever the business sector (transport, health, agriculture, education), the spatial level (local, regional or global) (Gavrilescu, 2008) the economic level (macro and micro) (Uzunidis, 2009) or the field of activity (HR, logistics, marketing….) (Björn, 2021; Giret, 2019; Kayikci, 2018). Sustainability is conceptualized commonly as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.43) and includes three pillars which are the environment, economy and society (Elkington, 1994; Olawumi and Chan, 2018). Sustainability is also closely linked to innovation. In this context, Le Bas (2016) addresses the notion of sustainable innovation (SI) as 'a mix of social innovation and environmental innovation' (p.14). According to Tello and Yoon (2009) a sustainable approach refers to 'the development of new products, processes, services and technologies that contribute to the development and well-being of human needs and institutions while respecting the worlds' natural resources and regenerative capacity' (p. 88).

Similar to the term of sustainability, it became common sense that artificial intelligence (AI) is a key to gain a competitive advantage in the future. Yigitcanlar and Cugurullo (2020) define artificial intelligence as "a technology which mimics the behaviors commonly associated with human intelligence" (p.1). Brem, Giones and Werle (2021) consider that "AI is set to become the key enabling technology of the 21st century" (p.1). Thanks to AI, machines can "learn from experience, adjust to new inputs, and perform human-like tasks" (Duan et al., 2019, p. 63). AI technologies offer three main benefits (Nishant et al., 2020) which are 1. task automation, 2. information extraction from large amounts of data (videos, photos, written reports, business

documents, social media posts, or e-mail messages), and 3. the use of computer resources to solve the most complex problems.

Hence, the idea of this call for paper is to combine both topics investigating how AI solutions could offer the possibility of facing the challenges raised by sustainable development.

Research on the relationships between AI and sustainability has mostly emphasized on machine learning (ML) models and algorithms on the environmental pillar of sustainability (Dhar, 2020; Nishant et al., 2020) with a particular focus on climate change (Debref, 2017), transportation and mobility (Albino et al., 2015; Liyanage et al., 2019), sustainable agriculture (Annosi et al., 2020), waste management (Demirci et al., 2020), biodiversity (Bagstad et al., 2016), energy (González Ordiano et al., 2018) or pollution management (Lytras and Visvizi, 2021; Myeong and Shahzad, 2021). However, the literature sheds light on contradictory inputs from AI with both positive impacts by, for instance, reducing the effects of climate crisis or predicting climate change and negative consequences as being a source of pollution. Moreover, only few studies focus on the link between AI and societal or economic aspects of sustainability (Acemoglu and Restrepo, 2018; Bolukbasi et al., 2016; Courtland, 2018), and the existing results appear equally ambiguous.

Therefore, in a world where AI and sustainability are of prime importance, further research is needed, and researchers are invited to explore and uncover the potential synergies and interactions between AI and sustainability, taking into consideration the triple bottom line and using a multi-scale approach. Emerging questions pertain to the role of firms as transmitters, mediators and/or users of information, governmental programs and policies, intellectual property and open access, demand-side interventions, such as influential consumer collectives, or citizenship and political social awareness. Papers could treat sectors such as (but not limited to) agriculture, education and training, space, finance, biochemistry, energy or health. We are convinced that this special issue is an excellent place to bring these lines of research together.

Papers proposed could include following topics (not limited to):

- Compatibility and interactions between AI and sustainability. Are AI and sustainability compatible? What are the links between AI and sustainability (roles and impacts)? Can AI be sustainable? What are the limits of AI in a sustainable environment? What are the most appropriate theoretical frameworks to address AI-sustainability issues?
- Role, functions, and interactions between AI actors in relation to sustainable development: Who are the AI actors? How are they organized? To what extent does the current AI ecosystem support sustainability? What are AI actors' main challenges? How do they apprehend sustainability?
- Exploration of the artificial intelligence-sustainability relationship from a multi-scale perspective: What are the acceptance factors of AI in a sustainable environment? What are the economic and social implications for customers, citizens, companies, governments, or international institutions? What are the implications specifically for small-and medium sized companies and startups? What are the regulatory implications? What are the main challenges for the future?
- Responsible research and innovation in the context of AI and sustainability: How can AI transform and foster sustainable research and innovation? How can AI promote a sustainable innovation?

## References


ACEMOGLU, D., RESTREPO, P. (2018). The Race between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment. *American Economic Review*, *108*(6), 1488-1542.

ALBINO, V., BERARDI, U., DANGELICO, R. M. (2015). Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *Journal of Urban Technology*, *22*(1), 3-21.

ANNOSI, M. C., BRUNETTA, F., CAPO, F., HEIDEVELD, L. (2020). Digitalization in the agri-food industry: The relationship between technology and sustainable development. *Management Decision*, *58*(8), 1737-1757.

BAGSTAD, K. J., REED, J. M., SEMMENS, D. J., SHERROUSE, B. C., TROY, A. (2016). Linking biophysical models and public preferences for ecosystem service assessments: A case study for the Southern Rocky Mountains. *Regional Environmental Change*, *16*(7), 2005-2018.

BJÖRN, F. (2021). Artificial intelligence-enabled environmental sustainability of products: Marketing benefits and their variation by consumer, location, and product types. *Journal of Cleaner Production*, *285*, 125242.

BOLUKBASI, T., CHANG, K.-W., ZOU, J. Y., SALIGRAMA, V., KALAI, A. T. (2016). *Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings*. 30th Conference on Neutral Information Processing Systems (NIPS). Barcelona, Spain. Advances in Neural Information Processing Systems, 1-9.

BREM, A., GIONES, F., WERLE, M. (2021). The AI Digital Revolution in Innovation: A Conceptual Framework of Artificial Intelligence Technologies for the Management of Innovation. *IEEE Transactions on Engineering Management*, 1-7.

COURTLAND, R. (2018). Bias detectives: The researchers striving to make algorithms fair. *Nature*, *558*, 357-360.

DEBREF, R. (2017). Revising Boundaries of the Process of Environmental Innovation to Prevent Climate Change. *Journal of Innovation Economics Management*, *24*(3), 9-34.

DEMIRCI, A., FENG, H., KRISHNAMURTHY, K. (Éds.). (2020). *Food Safety Engineering*. Springer International Publishing.

DHAR, P. (2020). The carbon impact of artificial intelligence. *Nature Machine Intelligence*, *2*(8), 423-425.

DUAN, Y., EDWARDS, J. S., DWIVEDI, Y. K. (2019). Artificial intelligence for decision making in the era of Big Data – evolution, challenges and research agenda. *International Journal of Information Management*, *48*, 63-71.

ELKINGTON, J. (1994). Towards the Sustainable Corporation: Win-Win-Win Business strategies for Sustainable Development. *California Management Review*, *36*(2), 90-100.

GAVRILESCU, M. (2008). Environmental Biotechnology: Achievements, Opportunities and Challenges. Dynamic Biochemistry, *Process Biotechnology and Molecular Biology*, *4*(1), 1-36.

GIRET, A. (2019). Smart and sustainable urban logistic applications aided by intelligent techniques. *Service Oriented Computing and Applications*, *13*(3), 185-186.

GONZÁLEZ ORDIANO, J. Á., WACZOWICZ, S., HAGENMEYER, V., MIKUT, R. (2018). Energy forecasting tools and services. *WIREs Data Mining and Knowledge Discovery*, *8*(2), e1235.

KAYIKCI, Y. (2018). Sustainability impact of digitization in logistics. *Procedia Manufacturing*, *21*, 782-789.

LE BAS, C. (2016). Frugal innovation, sustainable innovation, reverse innovation: Why do they look alike? Why are they different? *Journal of Innovation Economics & Management*, *21*(3), 9-26.

LIYANAGE, S., DIA, H., ABDULJABBAR, R., BAGLOEE, S. A. (2019). Flexible Mobility On-Demand: An Environmental Scan. *Sustainability*, *11*(5), 1262.

LYTRAS, M. D., VISVIZI, A. (2021). Artificial Intelligence and Cognitive Computing: Methods, Technologies, Systems, Applications and Policy Making. *Sustainability*, *13*(7), 3598.

MYEONG, S., SHAHZAD, K. (2021). How to Integrate the Data-based Strategies and Advanced Technologies into Efficient Air Pollution Management in Smart Cities?

NISHANT, R., KENNEDY, M., CORBETT, J. (2020). Artificial intelligence for sustainability: Challenges, opportunities, and a research agenda. *International Journal of Information Management*, *53*, 102104.

OLAWUMI, T. O., CHAN, D. W. M. (2018). A scientometric review of global research on sustainability and sustainable development. *Journal of Cleaner Production*, *183*, 231-250.

TELLO, S. F., YOON, E. (2009). Drivers of Sustainable Innovation: Exploratory Views and Corporate Strategies. *Seoul Journal of Business*, *15*(2), 85-115.

UZUNIDIS, D. (2009). Innovation, growth and sustainable development: General presentation. *Journal of Innovation Economics Management*, *3*(1), 5-11.

WCED. (1987). Brundtland Report (Britannica). World Commission on Environment and Development. https://www.britannica.com/topic/Brundtland-Report

YIGITCANLAR, T., CUGURULLO, F. (2020). The Sustainability of Artificial Intelligence: An Urbanistic Viewpoint from the Lens of Smart and Sustainable Cities. *Sustainability*, *12*(20), 1-24.

**Timetable for submission and acceptance of papers:**

- **November 30th, 2022:** Deadline for complete manuscripts through online paper submission: https://jiem.manuscriptmanager.net
- Guideline for authors: http://innovations.cairn.info/en/instructions-for-authors/
- **November 30th, 2023:** Final notification for acceptance

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