OECONOMIA
COPERNICANA
VOLUME 15 ISSUE 2 JUNE 2024
p-ISSN 2083-1277, e-ISSN 2353-1827
www.oeconomia.pl

EDITORIAL

Citation: Dadkhah, M., Bujdosó, Z., & Dávid, L. D. (2024). Transitioning from net-zero to climate-positive supply chains. *Oeconomia Copernicana, 15*(2), 359–366. https://doi.org/10.24136/oc.3156

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Article history: Received: 3.06.2024; Accepted: 10.06.2024; Published online: 30.06.2024

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Transitioning from net-zero to climate-positive supply chains

In our collective quest for sustainability, the notion of achieving net-zero carbon emissions has long been regarded as a crucial milestone. However, in the face of escalating environmental challenges, the time has come to elevate our ambitions and transition towards climate-positive supply chains. While net-zero targets focus on halting further environmental degradation, the concept of climate-positive supply chains goes a step further by actively contributing to the restoration of our planet. It entails not only reducing emissions, but also removing more carbon dioxide from the at-

mosphere than is emitted (Christiansen & Carton, 2021; Fankhauser *et al*., 2022; Tingting *et al*., 2023; Bai *et al*., 2023).

To embark on this transformative journey, we must adopt a holistic approach that encompasses innovation, collaboration, and accountability (Zheng *et al*., 2023; Małys, 2023; Fu *et al*., 2023). Companies must rethink traditional practices and prioritize sustainability, investing in renewable energy, energy-efficient technologies, and carbon capture solutions (Balcerzak & MacGregor Pelikánová, 2020; Balcerzak *et al*., 2023; Dvorský *et al*., 2023a; 2023b; Belas *et al*. 2024). Collaboration across sectors and borders is essential to drive systemic change. By sharing knowledge and resources, stakeholders can accelerate the transition towards climate-positive supply chains and amplify their impact on a global scale. Furthermore, accountability lies at the heart of this endeavour. Transparency in reporting emissions, setting ambitious targets, and holding ourselves and others accountable for our environmental footprint are paramount. It is through this commitment to transparency and continuous improvement that we can chart a course towards a more sustainable future. Embracing climate-positive supply chains presents not only environmental benefits but also economic opportunities. Companies that invest in sustainability can reduce costs, enhance their reputation, and gain a competitive edge in a rapidly evolving market (Peña *et al*., 2023; Turek *et al*., 2023; Bagh *et al*., 2023; MacGregor Pelikánová & Sani, 2023).

Nevertheless, transitioning to climate-positive supply chains will not be without challenges. It requires significant investment, technological innovation, and supportive policies to overcome barriers to adoption. However, the benefits far outweigh the costs, both for businesses and for society as a whole. As we stand on the brink of a climate crisis, the transition to climate-positive supply chains offers a ray of hope. It is a bold affirmation of our commitment to not only mitigating climate change, but also actively restoring the health of our planet. Together, let us embark on this journey towards a brighter, more sustainable future.

Advantages of artificial intelligence

The are discussions regarding support of sustainable development goals (SDGs) by disruptive/emerging technologies especially artificial intelligence (AI) (Dadkhah *et al*., 2024; Dávid & Dadkhah, 2023; Yin *et al*., 2023).

However, usage of AI to reach net-zero or climate-positive supply chains is less discussed. Looking up in Scopus provides 131 documents that discuss both AI and net-zero, but there is no document about usage of AI to reach climate positive supply chains (25 April 2024):

[(TITLE-ABS-KEY ("artificial intelligence") AND TITLE-ABS-KEY ("net-zero")) OR (TITLE-ABS-KEY ("artificial intelligence") AND TITLE-ABS-KEY ("net zero")]

The top most frequent keywords in the published articles are *artificial intelligence*, *machine learning*, *energy efficiency*, *zero emission*, *climate change*, *energy utilization*. The results indicate that role of AI in net zero is usually highlighted in smart building, optimizing energy efficiency, prediction of energy consumption, digitalization, etc. (Chen *et al*., 2023; Chen & Jin, 2023; Suslina *et al*., 2024). The biggest challenge to use AI for net zero is lack of data to train AI models, ethical concerns, and security challenges (Suslina *et al*., 2024; Taddeo *et al*., 2021). *Energies*, *Building and environment*, *Applied energy*, *Energy conversion and management*, *Energy economics* are most relevant journals. This confirms that most application of AI in net zero focus on energy utilization and management. The UK, China, India, Korea, Canada, and Italy are most relevant corresponding author's countries.

As there is no result in Scopus regarding AI to reach climate positive supply chains, the Scopus AI, an AI based tool that provides insight based on Scopus data, (Dhane *et al*., 2024) has been used. The provided insights indicate support of climate-positive supply chains by AI. AI provides predictive analytics for supply chains that allows real-time decision-making to optimizing operations and address sustainability concerns (Kaur *et al*., 2024; Madancian *et al*., 2024). AI also contributes in *Green Supply Chain Management* and can help to forecast demands and manage inventory in supply chains (Niranjan *et al*., 2021; Saad & Khamkham, 2022). It will be usual for AI and other disruptive technologies, i.e. blockchain, collaborate together, to provide more contribution in net zero applications. For example, the AI models can be trained based on trusted and shared data stored on the blockchain (Chavali *et al*., 2020; Lăzăroiu *et al*., 2023). The are cases of AI usage with Industrial Internet of Things, Industry 4.0, 5G system, smart cities, etc. to support net zero (Chen & Jin, 2023; Lăzăroiu *et al*., 2022).

Discussion and research agenda

The literature suffers from a gap regarding usage of emerging/disruptive technologies to transitioning from net-zero to climate-positive supply chains. There is a need for exploratory research that gather experts' insights and provides research directions. The usability of emerging/disruptive technologies and the timeline for their usage should also be cleared. Even the body of knowledge needs theoretical research or grounded theory-based studies, the practical usage of such technologies and solution-based research should not be omitted.

The research on use of emerging/disruptive and net zero also needs to be systematically reviewed to highlight the current gap and provides future directions. Since the current century can be named AI or data age, the use of AI tools, i.e. Chatbots, can be helpful to speedup process of research in this area. Overall, the disruptive/emerging technologies especially AI can be promising for net zero and also for transitioning from net-zero to climate-positive supply chains. However, there are some challenges and barriers that should be identified based on various contexts then related solution should be prepared to addressed them.

References

Bagh, T., Naseer, M. M., Khan, M. A., Pypłacz, P., & Oláh, J. (2023). Sustainable growth rate, corporate value of US firms within capital and labor market distortions: The moderating effect of institutional quality. *Oeconomia Copernicana*, *14*(4), 1211–1255. https://doi.org/10.24136/oc.2023.036.

Bai, T., Xu, D., Yang, Q., Dudás Piroska, V., Dénes Dávid, L., & Zhu, K. (2023). Paths to low-carbon development in China: The role of government environmental target constraints. *Oeconomia Copernicana*, *14*(4), 1139–1173. https://doi.org/10.24136/oc.2023.034.

Balcerzak, A. B., & MacGregor Pelikánová, R. (2020). Projection of SDGs in codes of ethics—case study about lost in translation. *Administrative Sciences*, *10*(4), 95. https://doi.org/10.3390/admsci10040095.

Balcerzak, A. P., Uddin, G. S., Igliński, B., & Pietrzak, M. B. (2023). Global energy transition: From the main determinants to economic challenges. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(3), 597–608. https://doi.org/10.24136/eq.2023.018.

Belas, J., Balcerzak, A. P., Dvorsky, J., & Streimikis, J. (2024). Influencing ESG perception in SMEs through CSR, business ethics, and HRM: An empirical study in V4 countries. *Amfiteatru Economic*, *26*(66), 532–549, https://doi.org/10.24818/EA/2024/66/532.

Chavali, B., Khatri, S. K., & Hossain, S. A. (2020). AI and blockchain integration. In *8th international conference on reliability, infocom technologies and optimization (Trends and future directions) (ICRITO)* (pp. 548–552). IEEE. https://doi.org/10.1109/ICRITO48877.2020.9197847.

Chen, L., Chen, Z., Zhang, Y., Liu, Y., Osman, A. I., Farghali, M., Hua, J., Al-Fatesh, A., Ihara, I., Rooney, D. W., & Yap, P.-S. (2023). Artificial intelligence-based solutions for climate change: A review. *Environmental Chemistry Letters*, *21*(5), 2525–2557. https://doi.org/10.1007/s10311-023-01617-y

Chen, Y., & Jin, S. (2023). Artificial intelligence and carbon emissions in manufacturing firms: The moderating role of green innovation. *Processes*, *11*(9), 2705. https://doi.org/10.3390/pr11092705.

Christiansen, K. L., & Carton, W. (2021). What 'climate positive future'? Emerging sociotechnical imaginaries of negative emissions in Sweden. *Energy Research & Social Science*, *76*, 102086. https://doi.org/10.1016/j.erss.2021.102086.

Dadkhah, M., Nedungadi, P., Raman, R., & Dávid, L. D. (2024). Emerging and disruptive technologies and the sustainable development goals: A state of art and research agenda. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *19*(1), 13–21. https://doi.org/10.24136/eq.2985.

Dávid, L. D., & Dadkhah, M. (2023). Artificial intelligence in the tourism sector: Its sustainability and innovation potential. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(3), 609–613. https://doi.org/10.24136/eq.2023.019.

Dhane, A. S., Sarode, S., Sarode, G., & Singh, S. (2024). A reality check on chatbot-generated references in global health research. *Oral Oncology Reports*, *10*, 100246. https://doi.org/10.1016/j.oor.2024.100246.

Dvorský, J., Bednarz, J., & Blajer-Gołębiewska, A. (2023a). The impact of corporate reputation and social media engagement on the sustainability of SMEs: Perceptions of top managers and the owners. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(3), 779–811. https://doi.org/10.24136/eq.2023.025.

Dvorský, J., Švihlíková, I., Kozubíková, Ľudmila, Frajtova Michalíková, K., & Balcerzak, A. P. (2023b). Effect of CSR implementation and crisis events in business on the financial management of SMEs. *Technological and Economic Development of Economy*, *29*(5), 1496–1519. https://doi.org/10.3846/tede.2023.19821.

Fankhauser, S., Smith, S. M., Allen, M., Axelsson, K., Hale, T., Hepburn, C., Kendall, J. M., Khosla, R., Lezaun, J., Mitchell-Larson, E., Obersteiner, M., Rajamani, L., Rickaby, R., Seddon, N., & Wetzer, T. (2022). The meaning of net zero and how to get it right. *Nature Climate Change*, *12*(1), 15–21. https://doi.org/10.1038/s41558-021-01245-w

Fu, Q., Zhao, X., & Chang, C.-P. (2023). Does ESG performance bring to enterprises' green innovation? Yes, evidence from 118 countries. *Oeconomia Copernicana*, *14*(3), 795–832. https://doi.org/10.24136/oc.2023.024.

Kaur, K., Kaur, G., Singh, B., Sehgal, S., & Trehan, S. (2024). Artificial intelligence (AI) as a transitional tool for sustainable food systems. In M. Thakur (Ed.). *Sustainable food systems (Vol. II)* (pp. 305–328). Springer Science and Business Media. https://doi.org/10.1007/978-3-031-46046-3_15.

Lazaroiu, G., Androniceanu, A., Grecu, I., Grecu, G., & Neguriță, O. (2022). Artificial intelligence-based decision-making algorithms, Internet of Things sensing networks, and sustainable cyber-physical management systems in big data-driven cognitive manufacturing. *Oeconomia Copernicana*, *13*(4), 1047–1080. https://doi.org/10.24136/oc.2022.030.

Lăzăroiu, G., Bogdan, M., Geamănu, M., Hurloiu, L., Luminița, L., & Ștefănescu, R. (2023). Artificial intelligence algorithms and cloud computing technologies in blockchain-based fintech management. *Oeconomia Copernicana*, *14*(3), 707–730. https://doi.org/10.24136/oc.2023.021.

MacGregor Pelikánová, R., & Sani, M. (2023). Luxury, slow and fast fashion: A case study on the (un)sustainable creating of shared values. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(3), 813–851. https://doi.org/10.24136/eq.2023.026.

Madancian, M., Taherdoost, H., Javadi, M., Khan, I. U., Kalantari, A., & Kumar, D. (2024). The impact of artificial intelligence on supply chain management in modern business. In Y. Farhaoui, A. Hussain, T. Saba, H. Taherdoost & A. Verma (Eds.). *Lectere notes networks systems: Vol. 838 LNNS* (pp. 566–573). Springer Science and Business Media. https://doi.org/10.1007/978-3-031-48573-2_82

Małys, Ł. (2023). The approach to supply chain cooperation in the implementation of sustainable development initiatives and company's economic performance. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(1), 255–286. https://doi.org/10.24136/eq.2023.008.

Niranjan, K., Narayana, K. S., & Rao, M. V. A. L. N. (2021). Role of artifical intelligence in logistics and supply chain. In *2021 International conference on computer communication and informatics (ICCCI)*. IEEE. https://doi.org/10.1109/ICCCI50826.2021.9402625.

Peña, I., Andrade, S. M., Muñoz, R. M., & Martínez, I. (2023). A grouping of the Sustainable Development Goals (SDGs) and their influence on business results: An analysis for Spanish companies. *Oeconomia Copernicana*, *14*(2), 551–583. https://doi.org/10.24136/oc.2023.015.

Saad, S. M., & Khamkham, M. (2022). The applications of AI in GSCM-A systematic literature review. In M. Shafik & K. Case (Eds.). *Advances in transdisciplinary engineering. Vol. 25* (pp. 348–353). IOS Press BV. https://doi.org/10.3233/ATDE220615.

Suslina, A., Savin, K., & Suslina, I. (2024). Greening telecom: Harnessing the power of artificial intelligence for sustainable communications. In A. V. Samsonovich & T. Liu (Eds.). *Biologically inspired cognitive architectures 2023. Proceedings of the 14th annual meeting of the BICA Society* (pp. 867–874). Springer Science and Business Media. https://doi.org/10.1007/978-3-031-50381-8_94.

Taddeo, M., Tsamados, A., Cowls, J., & Floridi, L. (2021). Artificial intelligence and the climate emergency: Opportunities, challenges, and recommendations. *One Earth*, *4*(6), 776–779. https://doi.org/10.1016/j.oneear.2021.05.018.

Tingting, B., Dong, X., Qianyi, Y., Vargáné, D. P., Dávid, L. D., & Zhu, K. (2023). Paths to low-carbon development in China: The role of government environmental target constraints. *Oeconomia Copernicana, 14*(4), 1139–1173. https://doi.org/10.24136/oc.2023.034.

Turek, J., Ocicka, B., Rogowski, W., & Jefmański, B. (2023). The role of Industry 4.0 technologies in driving the financial importance of sustainability risk management. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(4), 1009–1044. https://doi.org/10.24136/eq.2023.032.

Yin, H.-T., Wen, J., & Chang, C.-P. (2023). Going green with artificial intelligence: The path of technological change towards the renewable energy transition. *Oeconomia Copernicana*, *14*(4), 1059–1095. https://doi.org/10.24136/oc.2023.032.

Zheng, M., Feng, G.-F., & Chang, C.-P. (2023). Is green finance capable of promoting renewable energy technology? Empirical investigation for 64 economies worldwide. *Oeconomia Copernicana*, *14*(2), 483–510. https://doi.org/10.24136/oc.2023.013.

Acknowledgements

This work was supported by the Flagship Research Groups Programme of the Hungarian University of Agriculture and Life Sciences.

Ministry of Education and Science
Republic of Poland

The journal is co-financed in the years 2022–2024 by the Ministry of Education and Science of the Republic of Poland in the framework of the ministerial programme "Development of Scientific Journals" (RCN) on the basis of contract no. RCN/SN/0697/2021/1 concluded on 29 September 2022 and being in force until 28 September 2024.