

18th IFAC Symposium on Information Control Problems in Manufacturing (INCOM 2024)

Special Session “Decarbonising Digital Supply Chain (DDSC)”

The aim of a special session is to provide an overview of the state-of-the-art as well as to highlight current research directions and challenges in specific fields relevant to the conference area and especially to the 18th IFAC Symposium on Information Control Problems in Manufacturing (INCOM 2024) theme “Decarbonising Digital Supply Chain”.

Organizer(s) Information

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Session Information

Special Session Title: **Decarbonising Digital Supply Chain**

Short description of the proposed session:

In response to the threat of natural disasters and climate change, governments and organizations are now giving serious consideration to changing policies and strategies to mitigate or reduce the high risks associated with these events. One crucial aspect that needs to be addressed is greenhouse gas and carbon emissions, which have become the focal point due to the rising global temperatures. Today, there is a strong emphasis on implementing decarbonization practices and transitioning towards a net-zero economy worldwide. While this issue has been on the agenda for some time, the undeniable urgency of climate change necessitates rapid action to protect humanity. The goal of achieving a net-zero economy is pivotal for governments and businesses in their pursuit of sustainable development. By effectively reducing emissions, aligning with SDG 7 (affordable and clean energy for all), governments and organisations will have the capacity to achieve SDG 13's climate action targets and supporting the promotion of good health and well-being outlined in SDG 3. Previously,

decarbonisation practices fell short in significantly reducing overall emissions, which is why the term "net zero" has gained prominence. Both decarbonisation and net-zero approaches share the objective of balancing emissions and removals to achieve a carbon emissions balance and mitigate the negative impact of human activities on the environment and climate. However, the successful attainment of net zero objective and the realization of these interconnected SDGs hinges on the full implementation of SDG 17, which emphasizes the importance of global partnerships in mobilizing resources, fostering collaboration, and facilitating the transition to a net-zero economy.

Moving on to specificities, it is seen that supply chain organisations are the largest contributors to emissions. To achieve the ambitious net-zero target, supply chain networks must undergo a fundamental transformation in their operational models and practices, aligning with net-zero strategies. However, this necessitates a critical reevaluation of conventional thinking and an identification of the existing challenges that hinder the implementation of net-zero supply chains. The ongoing digitalization revolution in supply chain management further compounds these obstacles. Supply chain managers face the complex task of balancing technological constraints with environmental pressures. Embracing disruptive technologies such as Drone, Artificial Intelligence (AI), Machine Learning (ML), Blockchain, Advanced Analytics, and others can revolutionize supply chain operations, enabling significant progress towards net-zero goals.

We seek original research papers that explore topics such as the development of sustainable and resilient supply chain models, the integration of digital technologies and processes to improve sustainability and viability, and the role of stakeholder engagement in creating supply chains pathway towards netzero. Additionally, we welcome papers that investigate the use of data analytics and other innovative approaches to manage challenges to achieve decarbonized digital supply chains.

Potential research questions for the special issue include:

- 1) How can supply chain organizations leverage disruptive technologies to identify opportunities for carbon emission reduction across their value chains?
- 2) What are the key challenges in implementing data analytics for Net Zero initiatives, and how can these challenges be addressed effectively?
- 3) What role does technology play in predicting and tracking emission trends and supporting decision-making for Net Zero strategies?
- 4) How digitalisation can lead to decarbonisation of logistic and warehousing operations?
- 5) How can technologies help organizations align with the Science-Based Targets initiative (SBTi) and set science-based emissions reduction targets?
- 6) What are the ethical considerations Net Zero efforts within digital supply chain?
- 7) What are the opportunities for interdisciplinary research that combines environmental science, digital requirements, and sustainability strategy to advance Net Zero initiatives within supply chain?
- 8) How digital twins help organizations evaluate and select effective carbon offset projects and measure their impact on emissions reduction?

Submission Deadline: January 31, 2024

Reviewing papers & Notification of Acceptance: March 15, 2024

Final papers submission deadline: April 15, 2024

Early registration deadline: April 30, 2024

Late registration deadline: July 31, 2024

Conference date: August 28-30, 2024

The special session would welcome original research papers, case studies, and conceptual papers that address the above research questions, and showcase the latest thinking and innovative practices related to achieving Netzero Target in the era of Industry 4.0 and digital technologies in supply chain operations. The session would be an opportunity for researchers, practitioners, and policymakers to exchange knowledge, insights, and best practices and contribute to advancing the state of the art in sustainable supply chain management.

Accepted papers will be published open access in Elsevier's IFAC-PapersOnLine. Post-conference special issues for extended versions of accepted papers are planned in IFAC and other high-ranked journals.