Springer

Annals of Operations Research

Call for Papers

Special issue on Computational Logistics in the Food and Drink Industry: Advances in Modelling and Applications

Aims and scope:

Computational logistics uses models and algorithms, including machine learning and deep learning, to execute complex logistics/supply chain network designs. The computational logistics models and algorithms (Kannan et al., 2009) facilitate solutions to large scale problems to achieve improved accuracy and efficiency, higher productivity in enterprises, improved product visibility, lower inventory levels, higher resource utilization, improved transportation efficiency, risk assessment (Chang et al., 2017), and improved logistics resiliency, etc. In reality, optimal and efficient network design from farm to shelf drives the enterprises to adopt sustainable development goals through computational logistics models (examples: Unilever, Tesco, etc.). Appropriate implementation of the computational models can even scale down environmental impact (Koh et al., 2013) of food and drink supply chains significantly (Validi et al, 2018).

Over the years food and drink supply chain/logistics networks have been facing tremendous pressure to conform to the requirements of distribution, waste reduction, food and packaging quality, sustainability in food production, and many more (Yakovleva et al., 2012; Kaur and Singh, 2018; Zhong et al., 2017). Appropriate implementation of computational logistics can facilitate the food and drink industry to reduce waste from various sources, reduce carbon footprint, and improve resource efficiency and the energy-water-food nexus (Bieber et al., 2018; Kibler et al., 2018). For example, in the United Kingdom, the use of computational logistics has successfully enabled implementation of the three phases of the Courtauld

Commitment programme (WRAP, 2019) (examples: Cadbury, Mars, Nestlé, Heinz, Premier Foods, etc.).

Several examples elucidate that computational logistics acts as an enabler to complex food and drink supply chain networks for efficient resource optimization, cost reduction, and carbon footprint reduction within a circular economy. For example, Glanbia plc, one of Ireland's largest dairy processing companies selling products (e.g., Yoplait, Avonmore, and Kilmeaden) successfully reduced the number of distribution routes from 28 to 23, enabling substantial savings in delivery costs and carbon footprint through *Paragon*'s optimization solution (Paragon, 2010). Similarly, Greggs, the UK's leading bakery food-on-the-go retailer, is using *Paragon*'s optimization solution to enhance its distribution operation performance (Paragon, 2018). Several other leading enterprises in the food and drink industry, including ASDA, Sainsbury's, Fuller's, Tesco and AB Agri, are using computational logistics solutions. Nestlé USA is using '*FICO*® *Xpress Optimization*' – a computational optimization solver – to optimize redeployment of inventory from one distribution center to another (FICO, 2017), resulting in savings on transportation and production costs.

The computational logistics solutions combine advanced large-scale optimization techniques, (meta)heuristics and rule-based approaches, agent-based modelling, and simulation combined with digitalization tools for upstream and downstream sides of the logistics networks, including the distribution side.

Driven by the growing needs of the computational logistics in the food and drink industry in the context of the sustainable development goals (e.g. SDG #12) of the United Nations and Courtauld Commitment 2025, this special issue of the *Annals of Operations Research* is intended to include answers to the following research questions:

(a) What are the computational logistics models that can successfully drive the energy-water-food nexus in multi-echelon food and drink supply chain/logistics networks?
(b) How can computational logistics models be used to improve operational efficiencies of multi-echelon food and drink supply chain/logistics networks by

optimizing resources, minimizing wastes from various corners of the networks, and reducing the carbon footprint?

(c) What are the roles of the computational logistics optimizers for enhancing the energy efficacy in multi-echelon food and drink supply chain/logistics networks?

Computational logistics models and algorithms:

This special issue invites novel and high-quality research articles on the development of new computational logistics models and algorithms, including computational decision-support tools, in the food and drink industry. Original research articles that have not been published or considered for publication elsewhere may include the following topics with specific applications to food and drink supply chain/logistics networks.

- computational aspects of large scale optimization
- nature inspired computation
- multi-objective optimization
- combinatorial optimization
- hybrid methods
- neuro computing
- probabilistic computing
- evolutionary computing (including meta-heuristic optimization algorithms like particle swarm optimization and genetic algorithm etc.)
- agent-based modelling
- machine learning and deep learning etc.

Application areas:

Areas include but are not limited to the following application areas considering any of the aspects of the above three research questions and models/algorithms.

- waste reduction from food manufacturing, distribution, packaging, and consumption
- sustainable practices in multi-echelon food and drink supply chain/logistics network design

- design of multi-echelon cold chain networks
- carbon footprint / carbon emission, carbon cap, carbon trade and taxes in food and drink supply chain/logistics networks
- inventory-transportation problems for food and drink supply chain/logistics networks
- closed loop computational logistics models in food and drink supply chain / logistics networks
- complex food and drink distribution system including vehicle routing and location routing
- risk, uncertainties, cost efficiency, and resiliency in food and drink supply chain / logistics networks
- resource efficient food and drink supply chains considering energy-water-food nexus
- food and drink supply chain performance benchmarking
- simulations in food and drink supply chain network
- emerging computational logistics models in the era of digitalization (e.g., Industry 4.0, Supply Chain 4.0), circular economy, and deep learning.

The submission deadline is May 31, 2020.

Please select article type: **S.I.: Computational Logistics in Food and Drink Industry**

Instructions for authors can be found at:

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Contributions arising from papers given at a conference should be substantially extended, and should cite the conference paper where appropriate.

Manuscript submission: https://www.editorialmanager.com/anor/default.aspx

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