Managing supply chain operations in industrial symbiosis networks

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Industrial symbiosis (IS) engages separate companies in a collective approach to competitive advantage, involving physical exchanges of materials, energy, and services among them. Accordingly, companies can replace production inputs with wastes and by-products of others, thereby reducing the amount of wastes to be disposed of and the amount of raw materials to be purchased from conventional suppliers. IS is increasingly considered a useful strategy to support circular economy and sustainable development, since it is able to create economic and environmental benefits simultaneously. The implementation of IS is explicitly recommended by many governments including the European Commission (e.g., European Commission, 2015).

When companies implement IS practices, they establish an IS network (ISN) where firms are involved in buyer-supplier relationships characterized by a symbiotic nature. The latter requires to be managed by using operations management techniques. However, the relationships occurring in ISNs differ from traditional supply chain relationships, mainly because the products exchanged are outside of the core business of the waste producers. Therefore, several issues from the operational perspective emerge, which are specific to this context and need proper analysis.

For example, wastes exchanged in IS synergies are not produced upon demand of the waste users. Instead, both the quantity and the quality of produced wastes are driven by the amount of core-business products generated, as well as by the production technologies adopted. This might be responsible for creating a mismatch – in terms of both quantity and quality – between demand and potential supply of

wastes. In fact, since both the quantity and the quality of produced wastes can fluctuate over time, such wastes might not be a stable source of materials for waste users. Such a mismatch can even emerge as a consequence of disruptive events affecting the traditional supply chains of the involved companies. Furthermore, since large waste markets do not exist, companies need to arrange waste exchange prices and specific contractual clauses when creating new IS relationships.

Despite the importance of building bridges between IS and operations management has been widely recognized (Sarkis, 2012), there is a lack of knowledge on how to manage operations in ISNs. Few academic studies on this topic have been provided to date (e.g., Bansal and McNight, 2009; Fraccascia and Yazan, 2018; Herczeg et al., 2018). These studies propose theoretical contributions that analyze the IS practice from the supply chain perspective, mainly aimed at highlighting organizational and operational challenges that companies need to overcome when managing IS relationships.

The main goal of this Virtual Special Issue is to fill this knowledge gap and provide companies with useful suggestions on how to manage IS operations in an efficient, effective, and resilient way. The issue is open to papers adopting different research methodologies from qualitative to quantitative one. Theoretical contributions are also welcome. Particularly welcome are specific theories and applications that address the open questions above-mentioned.

Topics of interest include, but are not limited to, the following:

- Operations strategy for IS networks
- Mechanisms to mitigate the quantity mismatch between waste demand and supply
- Mechanisms to manage the variability in quality and quantity of waste flows
- Vulnerability of IS operations to disruptive events
- Ripple effects in symbiotic networks
- Misalignment incentive problems in IS networks
- Redundancy strategies for IS synergies
- Synchronizing waste exchanges among multiple suppliers and buyers of wastes
- Inventory strategies for wastes and by-products
- Production and delivery systems in IS networks
- Logistical synchronization among companies in IS networks
- Mechanisms of information sharing among symbiotic partners
- Performance measurements for IS operations
- Simulation models for day-by-day symbiotic operations
- Operational contracts for waste exchanges

Manuscript Preparation and Submission

A Virtual Special Issue (VSI) is an online-only grouping of Special Issue articles traditionally assigned to a single Special Issue. The articles in a VSI will be assigned a unique identifier and published in a regular journal issue. The unique identifier allows to simultaneously adding the article to a VSI in ScienceDirect.com. Articles grouped together in a VSI retain their original citation details. A VSI speeds up the publication of individual articles as, unlike the publication process for conventional Special Issue articles, a VSI does not need to wait for the final article to be ready before publication.

A detailed submission guideline is available as "Guide for Authors" at: http://www.journals.elsevier.com/resources-conservation-and-recycling. All manuscripts and any supplementary material should be submitted through Elsevier Editorial System (http://ees.elsevier.com/recycl). The authors must select "SI: IS Supply Chain" in the submission process.

Important dates

Full paper submission deadline: September 30, 2019

Final decision notification: January 31, 2020

Publication: As soon as accepted (VSI)

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