

## Managing supply chain operations in industrial symbiosis networks

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Industrial symbiosis (IS) is a subfield of industrial ecology that engages separate companies in a collective approach to competitive advantage, involving physical exchanges of material, energy, and services among them (Chertow, 2000; Lombardi and Laybourn, 2012). Accordingly, companies can replace production inputs with wastes and by-products of other firms, thereby reducing the amount of wastes to be disposed of and the amount of raw materials to be purchased from conventional suppliers (e.g., Fraccascia et al., 2017). Actually, IS is considered a useful strategy to support circular economy and sustainable development (e.g., Domenech et al., 2019), since it is able to create economic and environmental benefits simultaneously, and its implementation is explicitly recommended by European Commission (e.g., European Commission, 2015).

However, one of the main issues hampering the implementation of the IS approach is that companies lack of experience and knowledge on how to manage operations related to waste exchanges with other companies.

Few academic studies on this topic have been provided to date (e.g., Bansal and McNight, 2009; Herczeg et al., 2018), despite the importance of building bridges between industrial ecology and operations management is widely recognized (Kleindorfer et al., 2005). 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. However, there are no studies that address practical solutions to these challenges. Examples of open questions are related to synchronizing waste flows and logistic operations

among multiple companies, how to manage variability in quality and quantity of produced wastes, how to share the right information with the right symbiotic partner at the right time, how to design symbiotic operations with high resilience to perturbations.

The main objective of this special issue is filling this gap of knowledge and providing companies with useful suggestions on how to manage IS operations in an efficient and resilient way. Both case studies and theoretical contributions are welcome. Particularly welcome are specific theories and applications that address the open questions above-mentioned. Submitted papers have to comply with the philosophy of the journal.

Topics of interest in this special issue include, but are not limited to, the following:

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

### **Important dates**

Full paper submission deadline: **September 30, 2019**

Final decision notification deadline: **April 30, 2020**

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### **References**

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## Short biographies of proposing Guest Editors

**Luca Fraccascia** holds a PhD in Mechanical and Management Engineering. He is currently Assistant Professor at Sapienza University of Rome (Italy) and Postdoctoral Researcher at University of Twente (The Netherlands). Before his current positions, he has been Postdoctoral Researcher at the Polytechnic University of Bari. His main research interest concerns the implementation strategies of circular economy, mainly from the operational and business perspective. In particular, he is an expert of industrial symbiosis, which is recognized as one of the most powerful practices able to promote the circularity of the economic system. He has published in leading international journals (e.g., *International Journal of Production Economics*, *Ecological Economics*, *Applied Energy*, *Journal of Cleaner Production*, *Resources Conservation and Recycling*) and conference proceedings. He serves as Guest Editor for *Business Strategy and the Environment*. His studies are conducted in collaboration with scholars worldwide and with ENEA (Italian Agency for New Technologies, Energy, and Sustainable Economic Development).

**Ilaria Giannoccaro** was born in Bari, October 9, 1974. She is currently Associate Professor of Management Engineering at the Politecnico di Bari, Italy. She got the M. Sc. degree in Mechanical Engineering (110/110 cum laude) in April 1998 at the Polytechnic of Bari and in 2001 the Ph.D. degree in Economic and Management Engineering at the University of Rome Tor Vergata. She is Coordinator for International Mobility of Students in Management Engineering and Department Delegate for Internationalization. She also serves as Vice-Head of the Department of Mechanics Mathematics and Management. She has been visiting scholar at the Arizona State University - Department of Supply

Chain Management in 2011 and 2015 and at Santa Fe Institute in 2018. In 2011 she joined the Center for Supply Networks at WP Carey Business School, Arizona State University. She regularly acts as associate editor and member of scientific board of international conferences and as referee for more than 30 scientific journals. Her principal research interests concern supply chain management, collective decision-making, and circular economy. She is author of more than 100 papers mostly published in international books and high-quality journals, among which *European Journal of Operational Research*, *Ecological Economics*, *International Journal of Production Economics*, *Industrial Marketing Management*, *Journal of Cleaner Production*, *IEEE Transactions on Engineering Management*, *Production Planning and Control*, *Journal of Geographical Systems*, *Complexity*, *Physical Review E*, *Sustainability*, *Journal of Artificial Societies and Social Simulation*.

**Devrim Murat Yazan**, with a background in Industrial Engineering, holds a Ph.D. degree in Advanced Production Systems from Interpolytechnic School of Doctorate (Polytechnics of Bari-Turin-Milan, Italy, 2010) in the field of Innovation Management and Product Development, by the thesis entitled: ‘Economic and environmental sustainability of production chains: An Enterprise Input-Output approach’. He was a visiting Ph.D. at the Operations Department of University of Groningen (the Netherlands) for one year in 2009 and conducted research on the implementation and coordination of joint production chains via waste and end-of-life product recycling. After completing his Ph.D., he joined University of Twente (the Netherlands) where he currently works as an assistant professor.

One of his research interests is circular economic business models with a focus on the design and development of industrial symbiosis networks where waste of a firm substitutes the primary resource of another firm. Since September 2015 he is involved in the EU project entitled: ‘SHAREBOX- Secure Management Platform for Shared Process Resources’ which is funded by the *European Commission within the Horizon2020 Sustainable Processing Industry through Resource and Energy Efficiency (SPIRE) framework*. He is the head of the technology development team of the SHAREBOX project. The project aims at developing a decision-support-system for secure management of resource-sharing in industrial symbiosis networks. His research group has the role of implementing intelligent decision-support tools using input-output modeling, game theory, and agent-based modeling in SHAREBOX project.

**Thomas Choi** is Harold E. Fearon Eminent Scholar Chair of Purchasing Management at W. P. Carey School of Business, Arizona State University. He leads the study of the upstream side of supply chains, where a buying company interfaces with many suppliers organized in various forms of networks. He has published in the *Academy of Management Executive*, *Decision Sciences*, *Harvard Business Review*, *Journal of Operations Management*, *Production and Operations Management* and others. He has co-authored two trade books on purchasing and supply management.

Professor Choi is executive director of CAPS Research, a joint venture between Arizona State University and the Institute for Supply Management. He also co-directs the Complex Adaptive Supply Networks Research Accelerator (CASN-RA), a research group made up of scholars from around the world interested in supply networks and complexity.

He has worked with numerous corporations including LG Electronics, Toyota, Volvo, and U.S. Department of Energy. He served as co-EIC for the Journal of Operations Management from 2011 to 2014. In 2012, he was recognized as the Distinguished Operations Management Scholar by the OM Division at the Academy of Management. In 2018, he was ranked in the top one percent of researchers worldwide in economics and business according to Clarivate Analytics and Web of Science.

**Dmitry Ivanov** is professor of Supply Chain Management at Berlin School of Economics and Law (HWR Berlin), deputy director and executive board member of Institute for Logistics (IfL) at HWR Berlin, and director of master program in Global Supply Chain and Operations Management at HWR Berlin.

His *research* explores supply chain structural dynamics and control, with an emphasis on global supply chain design with disruption risks, optimal control and scheduling in Industry 4.0 systems, supply chain simulation and risk analytics in the digital era. He is co-author of structural dynamics control methods for supply chain management. He applies mathematical programming, simulation, control and fuzzy theoretic methods. Based upon triangle “process-model-technology”, he investigates the dynamics of complex networks in production, logistics, and supply chains. Most of his courses and research focuses on the interface of supply chain management, operations research, industrial engineering, and digital technology.

His research record includes around 300 publications, with 66 papers in prestigious academic journals and the leading books “Global Supply Chain and Operations Management” and „Structural Dynamics and Resilience in Supply Chain Risk Management“. He is a recipient of German Chancellor Scholarship (2005-2006), Best Paper Award of International Journal of Production Research (2018), and Commended Paper Award at International Conference LogDynamics (2018). He is listed in WiWo ranking 2019 „The Best Reseachers in Business Administration“ in categories TOP 100 and Long-Term Stars.

He is leading working groups, tracks and sessions on the Digital Supply Chain, Supply Chain Risk Management and Resilience in global research communities. He is Editor of International Journal of Integrated Supply Management and an Associate Editor in International Journal of Production Research and International Journal of Systems Science. He is an editorial board member, associate and guest-editor in different journals.