



2 Preface: sustainable operations in manufacturing enterprise

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7 It is indeed a real pleasure to announce the publication of this special issue, Sustainable
 8 Operation in Manufacturing Enterprise (SOME), for *Annals of Operations Research*. Over-AQ1
 9 all, many papers were received for this special issue, and based on reviewer reports the best
 10 papers are included in this issue. This special issue is focused primarily on the three sus-
 11 tainable aspects, 3Ps of sustainability: profit, planet, and people. The accepted papers focus-AQ2
 12 on sustainability, circular economy, multi-criteria decision making (MCDM), optimization
 13 modelling using mixed integer linear/non-linear program (MLP/MINLP), and data envel-AQ3
 14 opment analysis (DEA) having some applications to industry and society were considered. AQ4
 15 A special thanks goes to all the authors and to the learned reviewers for their tireless
 16 efforts in providing constructive and useful feedback that helped in making decisions on
 17 the papers. On behalf of the Guest Editors, we would like to express our sincere thanks
 18 to Editor-in-Chief Endre Boros, for providing us an opportunity to publish this collection
 19 of papers and Publications Managers Katie D'Agosta and Ann Pulido for their support in
 20 making this special issue a success. As highlighted above, all articles illustrate various

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21 interesting aspects on sustainable manufacturing and allied areas. The papers are broadly
22 grouped into the following five main topics.

23 1 Sustainability

24 Today, even the most powerful manufacturing and service firms cannot do business in an
25 arbitrary manner considering only profits. In fact, to mitigate the tension between a firm's
26 goal of profit optimization and the public's criticisms of the firm's negative social and
27 environmental impacts, the concept of sustainable operations has already been popularly
28 embraced by the business community. Additionally in the 21st century, governments and
29 environmental agencies worldwide have been enforcing legislations to reduce the carbon
30 footprint and other pollutants. The call for businesses to focus resources on sustainable
31 operations has led to admirable theoretical and empirical works in recycling and remanu-
32 facturing, humanitarian logistics, low-carbon supply chain, sustainable transport, and many
33 other areas of multi-channel business that have strong intersections with the traditional
34 purview of a firm's operations and management. However, this leads to a huge challenge
35 to design sustainable operations. So, there is a demand for innovative solid theories, frame-
36 works, and mathematical models for sustainable operations in manufacturing enterprises
37 including multi-channel businesses.

38 In this direction, Lamba, Kumar, Mishra, and Rajput developed a sustainable dynamic
39 layout and proposed a simulated annealing based algorithm to provide a good solution that
40 not only minimizes cost but also minimizes carbon emission costs to optimize sustainabil-
41 ity. Wu, Huang, Zhou, and Zhu in their paper on regional green growth provided a sustain-
42 able development model of China in the presence of sustainable resources recovered from
43 pollutants. Dora, Wesana, Gellynck, Seth, Dey, and De Steur showed an importance of sus-
44 tainable operations in food loss and took a case study from the Belgium food processing
45 industry. Similarly, Yassine presented a sustainable economic production model showing
46 how the quality and emissions tax are effected in the transportation industry. In the same
47 way, Taleizadeh and Hazarkhani developed a joint pricing and inventory decision consider-
48 ing carbon emissions. Wu, Chen, and Ji discussed sustainable trade promotion decisions
49 under demand disruption in manufacturer-retailer supply chains. A very interesting work
50 by Zhang and Zhang provided conceptual linkage between how a sustainable operation can
51 achieve economic benefit and energy savings for Chinese manufacturing industries. Wang
52 and Li proposed an economic design under gamma shock model of the control chart for
53 sustainable operations. Validi, Bhattacharya, and Byrne described a sustainable distribu-
54 tion system design using a two-phase design of experiment based method. Lei, Shiyun,
55 Yanfei, and Yuan provided a case study of wind power in China for sustainable operations
56 with the help of investment risk evaluation and optimization of a renewable energy pro-
57 ject. Similarly, Li, Wen, Tseng, and Chiu predicted photovoltaic array on short-term output
58 power method in the power generation industry. Deng and Gibson carried out a case study
59 on Hebei province in China where they showed sustainable use of land for improving eco-
60 efficiency. Rentizelas, Jabbour, Al Balushi, and Tuni discussed social sustainability on the
61 oil and gas industries, and provided a theoretical framework of sustainable supply chains.
62 Shubin, Dubey, Gunasekaran, Hazen, Roubaud, Gupta, and Foropon examined a sustain-
63 able supply chain management of SMEs using a resource based view and institutional the-
64 ory. Jabbour, Janeiro, Jabbour, Junior, Salgado, and Jugend analysed the social aspect of
65 sustainability by unveiling a potential relationship in the context of Brazil. Finally, Dubey,

66 Gunasekaran, Childe, Papadopoulos, Luo, and Roubaud intensely analysed the upstream
67 supply chain visibility and complexity effect of a company's sustainable performance from
68 Indian manufacturers' perspective.

69 **2 Environmental sustainability**

70 In the broad category of environmental-based sustainability, Sun, Du, and Wang analysed
71 on a large scale, data taken from China to study environmental regulations, enterprise pro-
72 ductivity, and green technological progress. Schilkowski, Shukla, and Choudhary quan-
73 tified the circularity of regional industrial waste across a multi-channel enterprise. Pan,
74 Han, Lu, and Ming provided a framework to evaluate the green innovation ability of a
75 manufacturing enterprise. Ciardiello, Genovese, and Simpson presented a unified coopera-
76 tive model for environmental costs in supply chains. Li, Deng, Zhou, and Feng provided
77 strategies for environmental governance in a two-echelon supply chain. Han, Shen, and
78 Bian developed an optimal recovery strategy of a manufacturer utilizing the concepts of
79 remanufacturing or recycling materials. Ghosh, Shah, and Swami studied product greening
80 and pricing strategies of firms under green sensitive consumer demand and environmental
81 regulations. Choi and Cai proposed an analytical model to investigate the effect of lead
82 time reduction in fabric sourcing on the performances of the fabric supplier and apparel
83 manufacturer as well as the environment. Du, Zhu, Zhu, and Tang in their paper incorpo-
84 rated various carbon emission costs and cap-and-trade concerns into a multi-period carbon
85 reduction problem using Stackelberg game. The paper by Han, Jiang, Zhao, Leung, and
86 Luo consider regulations of carbon emissions restrictions in a real-world corporation in
87 China that produces, sells, and recycles polyethylene terephthalate (PET) bottles used for
88 soft drinks. Finally, Mohan and Amit proposed a system dynamics model using disman-
89 tler's dilemma approach for end-of-life vehicle recycling markets.

90 **3 Multi-criteria decision making**

91 Chauhan, Kaur, Yadav, and Jakhar applied a MCDM approach to develop a hybrid model
92 to investigate and select a sustainable supply chain for agriculture products in India.
93 Similarly, Singh and Gupta applied another MCDM technique, i.e., ISM and TOPSIS to
94 develop a framework for a sustainable maintenance system for an enterprise. Sushil pro-
95 vided framework for interpretive multi-criteria ranking of production systems using ordinal
96 weights and transitive dominance relationships. Zhan, Zhang, Li, Zhang, and Qi evaluated
97 food security of the Heihe River Basin using a DEA-based approach. An, Meng, Xiong,
98 Wang, and Chen assessed the relative efficiency of Chinese high-tech manufacturing com-
99 panies using again a DEA-based approach.

100 **4 Optimization**

101 Dong, Hicks, and Li proposed a heuristic approach for a global navigation satellite system
102 that can be used for navigation to provide better map-mapping, and thus to bring sustain-
103 ability in navigation. Taleizadeh, Govindan, and Ebrahimi studied the effect of promotional
104 cost sharing on the decision of a two-level supply chain considering uncertain demand. De,

105 Pratap, Kumar, and Tiwari proposed a MILP model for a hybrid dynamic berth allocation
106 problem taking fuel costs into consideration and optimizing fuel emissions. Chen, Cheng,
107 and Chou applied a multi-objective genetic algorithm for an energy efficient hybrid flow
108 shop scheduling problem. Prakash, Kumar, Soni, Jain, and Rathore developed a closed loop
109 supply chain network design model under risks and demand uncertainty. Wu, Cao, Xiao,
110 and Guo developed a mathematical model for urban emergency logistics for urban rain-
111 storm and water logging disasters towards social sustainability. Yan, Du, and Hu study the
112 impact of risk inequity averse factor on supply chain performance in the newsvendor con-
113 text. Dunbar, Belieres, Shukla, Amirghasemi, Perez, and Mishra in their paper modelled
114 a spare part delivery problem for an on-demand logistics company, as a variant of vehicle
115 routing problem using column generation technique. Finally, Srivastava and Agrawal pro-
116 posed a MILP model for mixture inventory systems with order crossover.

117 5 Empirical study

118 Li, Lim, and Wang brought empirical evidence from Chinese fashion industries for green
119 manufacturing. Liu, Sun, Yang, and Wu showed how ownership structure effects bank
120 deposits and loan efficiencies that is an empirical analysis of Chinese commercial banks.
121 Chien, Kuo, and Yu did an empirical study on tool allocation to smooth work-in-process to
122 recycle time reduction for sustainable operations.

123 6 Conclusion

124 The Guest Editors hope that this special issue on Sustainable Operations in Manufactur-
125 ing Enterprise (SOME) advances the sustainability-based research on manufacturing and
126 service firms. We believe the sustainable operations and its application will still grow and
127 continue for a significant period of time. Finally, we would like to thank the numerous
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