

Costa Salas, Yasel José; Melo, Teresa

Research Report

Supplementary material to the book chapter "Facility Location Modeling in Supply Chain Network Design: Current State and Emerging Trends"

Schriftenreihe Logistik der Fakultät für Wirtschaftswissenschaften der htw saar, No. 20

Provided in Cooperation with:

Saarland University of Applied Sciences (htw saar), Saarland Business School

Suggested Citation: Costa Salas, Yasel José; Melo, Teresa (2021) : Supplementary material to the book chapter "Facility Location Modeling in Supply Chain Network Design: Current State and Emerging Trends", Schriftenreihe Logistik der Fakultät für Wirtschaftswissenschaften der htw saar, No. 20, Hochschule für Technik und Wirtschaft des Saarlandes, Fakultät für Wirtschaftswissenschaften, Saarbrücken

This Version is available at:

<https://hdl.handle.net/10419/265542>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Y. Costa | T. Melo

Supplementary material to the book chapter
*“Facility Location Modeling in Supply Chain Network Design:
Current State and Emerging Trends”*

**Schriftenreihe Logistik der Fakultät für Wirtschaftswissenschaften
der htw saar**

Technical reports on Logistics of the Saarland Business School

Nr. 20 (2022)

logistik

© 2021 by Hochschule für Technik und Wirtschaft des Saarlandes, Fakultät für Wirtschaftswissenschaften,
Saarland Business School

ISSN 2193-7761

The impact of flexible warehouse lease contracts on the configuration of a two-echelon distribution network

Y. Costa | T. Melo

Bericht/Technical Report 20 (2022)

Verantwortlich für den Inhalt der Beiträge sind die jeweils genannten Autoren.

Alle Rechte vorbehalten. Ohne ausdrückliche schriftliche Genehmigung des Herausgebers darf der Bericht oder Teile davon nicht in irgendeiner Form – durch Fotokopie, Mikrofilm oder andere Verfahren – reproduziert werden. Die Rechte der öffentlichen Wiedergabe durch Vortrag oder ähnliche Wege bleiben ebenfalls vorbehalten.

Die Veröffentlichungen in der Berichtreihe der Fakultät für Wirtschaftswissenschaften können bezogen werden über:

Hochschule für Technik und Wirtschaft des Saarlandes
Fakultät für Wirtschaftswissenschaften
Campus Rotenbühl
Waldhausweg 14
D-66123 Saarbrücken

Telefon: +49 (0) 681/ 5867 - 519

E-Mail: fakultaet-wiwi@htwsaar.de

Internet: www.htwsaar.de/wiwi

SUPPLEMENTARY MATERIAL

This document contains the supplementary material to the following book chapter:

Y. Costa, T. Melo, *Facility Location Modeling in Supply Chain Network Design: Current State and Emerging Trends*, In: *The Palgrave Handbook of Supply Chain Management*, J. Sarkis (ed.), Heidelberg, 2022.

The summary and keywords of the chapter are included next.

Abstract

Facility location decisions play a critical role in the design of supply chain networks. This chapter outlines key features of facility location problems and their integration with various logistic operations in the context of network (re)design. Modeling approaches and solution methods are also discussed for these challenging combinatorial optimization problems. In addition, we examine five emerging trends that will continue to drive research in this area, namely, sustainable development, the transition to a circular economy, data source-related issues, disruptive events and resilience, and omnichannel distribution in the retail sector. We review and classify recent contributions, identify research gaps, and provide directions for future research.

Keywords

Facility location, Sustainable network design, Circular economy, Data scarcity, Resilience, Omnichannel.

□ **Tables with all numbered references**

Table 1 Comprehensive classification of FLPs

| Key feature | Aspect | Recent study |
|----------------------------------|---|--------------|
| Number of objectives | ☒ single objective (total cost/profit) | [49] |
| | ☒ multi-objective (e.g., total cost + responsiveness) | [65] |
| Type of objective function | ☒ covering (set covering) | [37] |
| | ☒ median (p-median) | |
| | ☒ center (p-center) | |
| | ☒ hierarchical (successively inclusive) | |
| | ☒ flow capturing | |
| | ☒ hub location | |
| | ☒ dispersion (p-dispersion) | |
| | ☒ anti-median & anti-center | |
| Number of facilities | ☒ single facility (no demand allocation) | [159] |
| | ☒ multiple facilities | [136] |
| Decision space | ☒ continuous (points of a continuous space) | [99] |
| | ☒ discrete (finite list of potential sites) | [184] |
| | ☒ graph (located on vertices/arcs) | [45] |
| Number of commodities | ☒ single commodity | [178] |
| | ☒ multi-commodity | [38] |
| Planning horizon | ☒ single period | [44] |
| | ☒ multi-period | [48] |
| Input parameters | ☒ deterministic | [78] |
| | ☒ probabilistic | [208] |
| | ☒ possibilistic | [76] |
| Capacity configuration | ☒ static (unlimited and limited capacity) | [127] |
| | ☒ dynamic setting (expansion and contraction) | [47] |
| Supply chain structure | ☒ single echelon | [46] |
| | ☒ multi-echelon | [52] |
| Facility typology | ☒ single type (e.g., warehouses) | [159] |
| | ☒ multi-type (e.g., warehouses, stores) | [16] |
| Competition & cooperation | ☒ with interaction (multiple players) | [54] |
| | ☒ without interaction (single player) | [127] |
| Integration with other decisions | ☒ location-routing models | [204] |
| | ☒ location-inventory models | [155] |
| | ☒ location-inventory-routing models | [189] |

Table 2 Performance indicators of SCND models addressing all dimensions of sustainability

| Performance indicator | Studied aspect | Reviewed article |
|-----------------------|--------------------|--|
| Economic | cost | [6], [10], [11], [26], [33], [59], [72], [76], [77], [81], [90], [94], [95], [115], [136], [137], [164], [165], [166], [176], [181], [201], [210], [227], [229], [230], [232] |
| | profit | [73], [79], [145], [147], [148], [169], [183], [191], [192], [234] |
| Environmental | facility location | [6], [10], [11], [59], [76], [77], [81], [90], [94], [95], [147], [148], [165], [169], [181] |
| | procurement | [6], [11], [79], [94], [95], [183], [227], [229] |
| | production | [6], [11], [26], [59], [72] ⁺ , [76], [77], [79], [81], [90], [94], [95], [137], [145], [147], [148], [165], [166], [169], [176], [181], [183], [191] ⁺ , [201], [227], [229] |
| | material handling | [11], [59] [73] ⁺ , [81], [90], [94], [95], [145], [165], [166], [169], [181], [183], [201], [227], [229] |
| | transportation | [6], [10], [11], [26], [33], [59], [72] ⁺ , [76], [77], [79], [81], [90] ⁺ , [94], [95], [136], [137], [145], [147], [148], [165], [166], [169], [176], [181], [183], [191] ⁺ , [192] ⁺ , [201], [210], [227], [229], [230], [232] |
| | recycling/disposal | [11], [59], [79], [227], [229] |
| | energy consumption | [76], [77], [137] |
| | waste generation | [11], [76], [77], [95], [136], [164], [234] |
| | water consumption | [6], [76], [77], [137], [176], [191] ⁺ , [201] |
| | other indicators | [115], [164], [176] |
| | Social | job creation |
| accidents/damages | | [59], [90], [95], [145], [164], [169], [181], [192] |
| regional development | | [10], [11], [33], [81], [165], [230] |
| equity | | [10], [90], [136] |
| other indicators | | [10], [11], [72], [73] ⁺ , [76], [77], [94], [95], [115], [176], [191], [201], [210], [234] |

⁺indicator embedded in one or several constraints; ⁺⁺consideration of fixed and variable number of job opportunities

Table 3 Classification of articles that use optimization methods to deal with supply chain disruptions

| Article | Source of risk | Disruption | Application context |
|---------|----------------|---------------|-----------------------------------|
| [74] | DD, SD, ED | DD1, SD1, ED1 | glass sector |
| [174] | DD | DD4 | automotive industry |
| [21] | SD | SD1, SD3 | agri-business |
| [135] | DD, SD | DD2, SD1 | |
| [60] | ED | ED1 | humanitarian logistics |
| [122] | SD | SD1 | HP case study |
| [86] | SD | SD1 | filter manufacturer |
| [223] | ED | ED1 | dairy industry |
| [83] | DD, SD | DD4, SD1 | automotive industry |
| [186] | ED | ED3 | COVID-19 vaccine supply |
| [161] | PD | PD1 | pharmaceutical sector |
| [100] | ED | ED1 | medical device manufacturer |
| [137] | DD | DD2, DD3 | tire industry |
| [113] | ED | ED1 | glass sector |
| [224] | ED | ED1 | dairy industry |
| [195] | SD | SD1 | printers-cartridge manufacturing |
| [97] | PD, ED | PD2, ED1 | humanitarian logistics |
| [120] | ED | ED1 | humanitarian logistics |
| [123] | ED | ED3 | |
| [171] | SD | SD1 | electronic manufacturing industry |
| [98] | ED | ED1 | humanitarian logistics |
| [111] | SD | SD1 | plastic sector |
| [179] | DR, SD, ED | DD2, SD1, ED1 | pharmaceutical sector |
| [5] | ED | ED3 | |
| [182] | DD, SD, ED | DD2, SD1, ED1 | humanitarian logistics |
| [75] | ED | ED1 | |
| [185] | ED | ED3 | COVID-19 vaccine supply |
| [153] | SD | SD1 | |
| [84] | ED | ED3 | food sector |
| [207] | SD | SD1 | pharmaceutical sector |

PROCESS (PD): product quality problems (PD1), equipment failure (PD2), IT-driven problems (PD3), labor strike (PD4). **CONTROL** (CD): safety stock policy (CD1), ordering quantity policy (CD2), asset management policy (CD3), transportation management problems (CD4). **DEMAND** (DD): volatile demand (DD1), unanticipated demand (DD2), market changes (DD3), competition changes (DD4), forecasting errors (DD5), unusual customer payment delays (DD6). **SUPPLY** (SD): shortage in supply market (SD1), sudden supplier demise (SD2), variability of lead time (SD3), supplier quality problems (SD4). **ENVIRONMENTAL** (ED): natural disaster (ED1), terrorism and war (ED2), diseases and epidemics (ED3), political instability (ED4), technology changes (ED5)

Table 4 Selected features of articles addressing omnichannel network design

| Studied component | Specific aspect | [14] | [39] | [92] | [104] | [126] | [130] | [132] | [142] | [143] | [219] | [220] | [221] |
|--------------------|---------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Main decision | Warehouse location | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | ✓ |
| | Inventory in store | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| | Demand allocation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Customer behavior | | ✓ | ✓ | | ✓ | | | | | ✓ | | |
| Objective function | Economic | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Environmental | | | | | | | | | | | | ✓ |
| | Social | | | | | | | | | | | | |
| Modeling approach | MILP | | | | | | | | ✓ | ✓ | | | ✓ |
| | TS-MILP | ✓ | ✓ | | | | | | | | | | |
| | LP | | | ✓ | | | | | | | | ✓ | |
| | NLP | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| Solution approach | Commercial software | | | ✓ | | | | ✓ | ✓ | ✓ | | | ✓ |
| | Exact method | ✓ | ✓ | | ✓ | | ✓ | | | | ✓ | ✓ | |
| | Heuristic | | | ✓ | | ✓ | | | | | | | |
| Flow type | Single product | | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Multi-product | ✓ | | ✓ | ✓ | ✓ | | | | | | | |

□ **Figures with all numbered references**

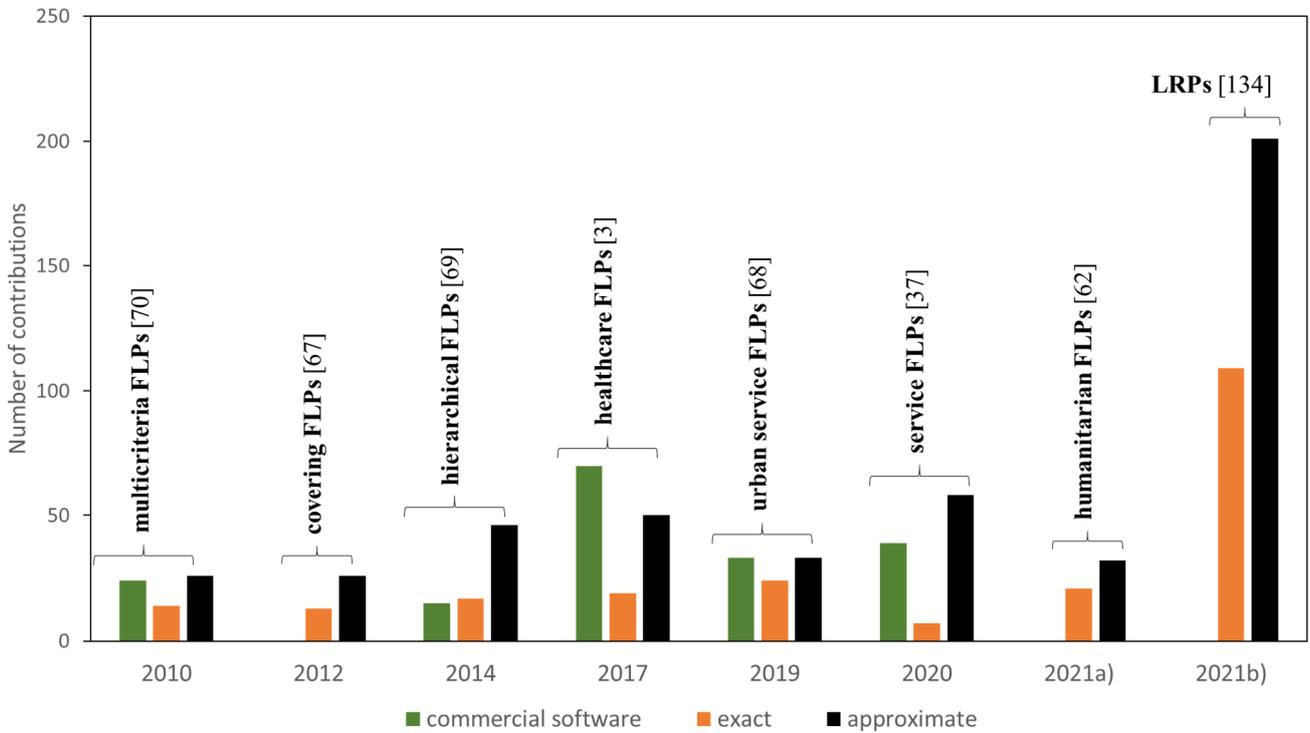


Fig. 2 Key review articles that provide comprehensive analyses of solution methods for FLPs

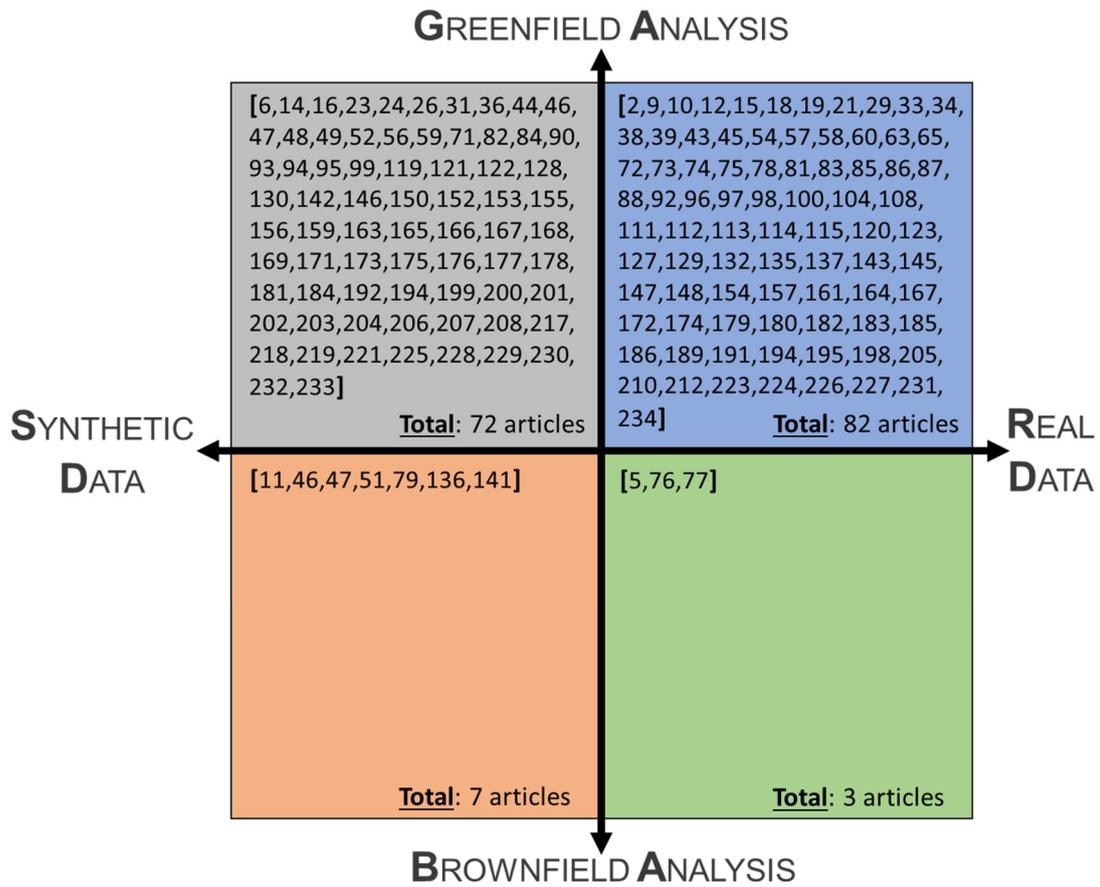


Fig. 3 General approaches and data sources used in the reviewed articles

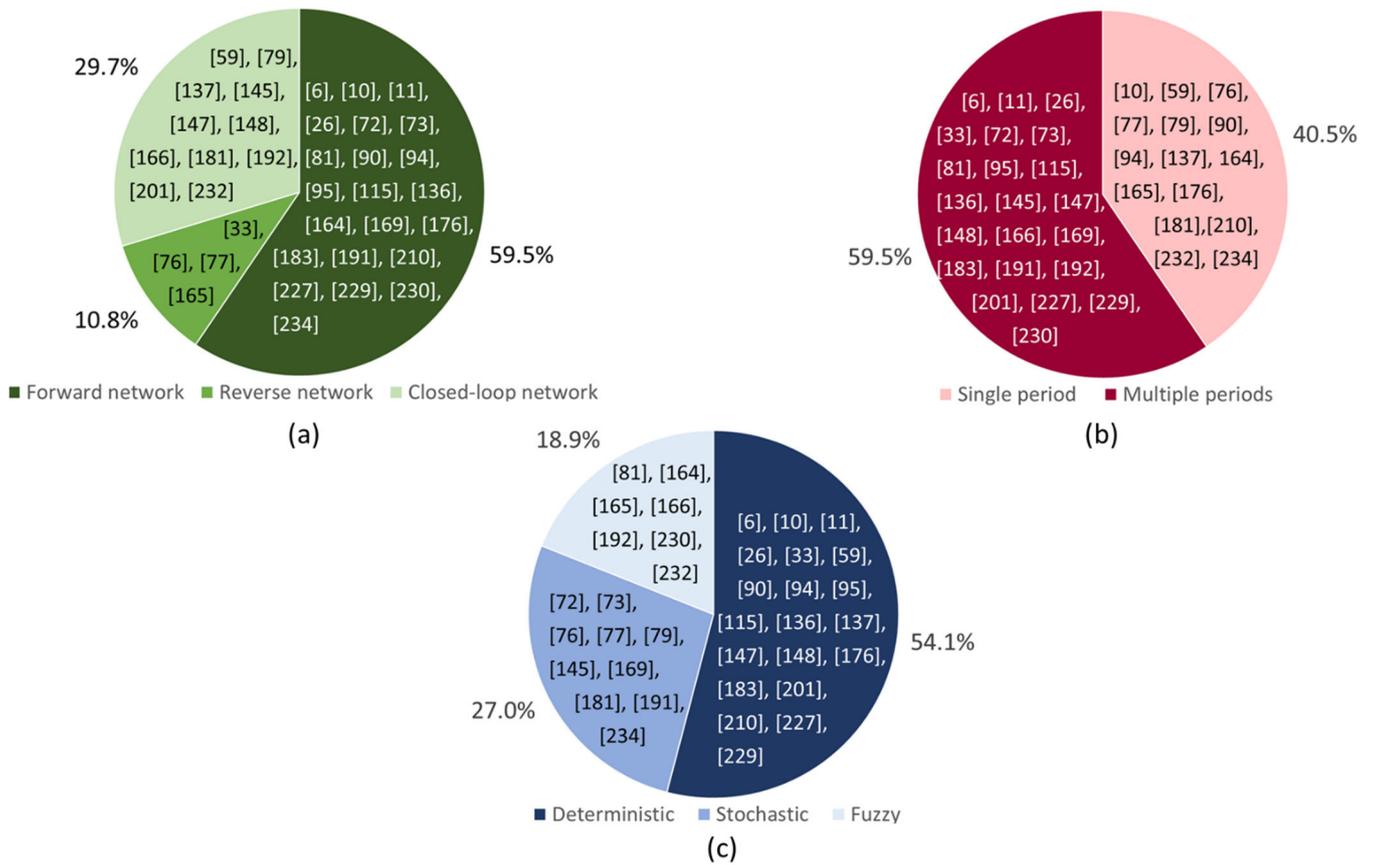


Fig. 4 Selected features of sustainable SCND models. (a) Type of supply chain network. (b) Planning horizon. (c) Type of modeling approach

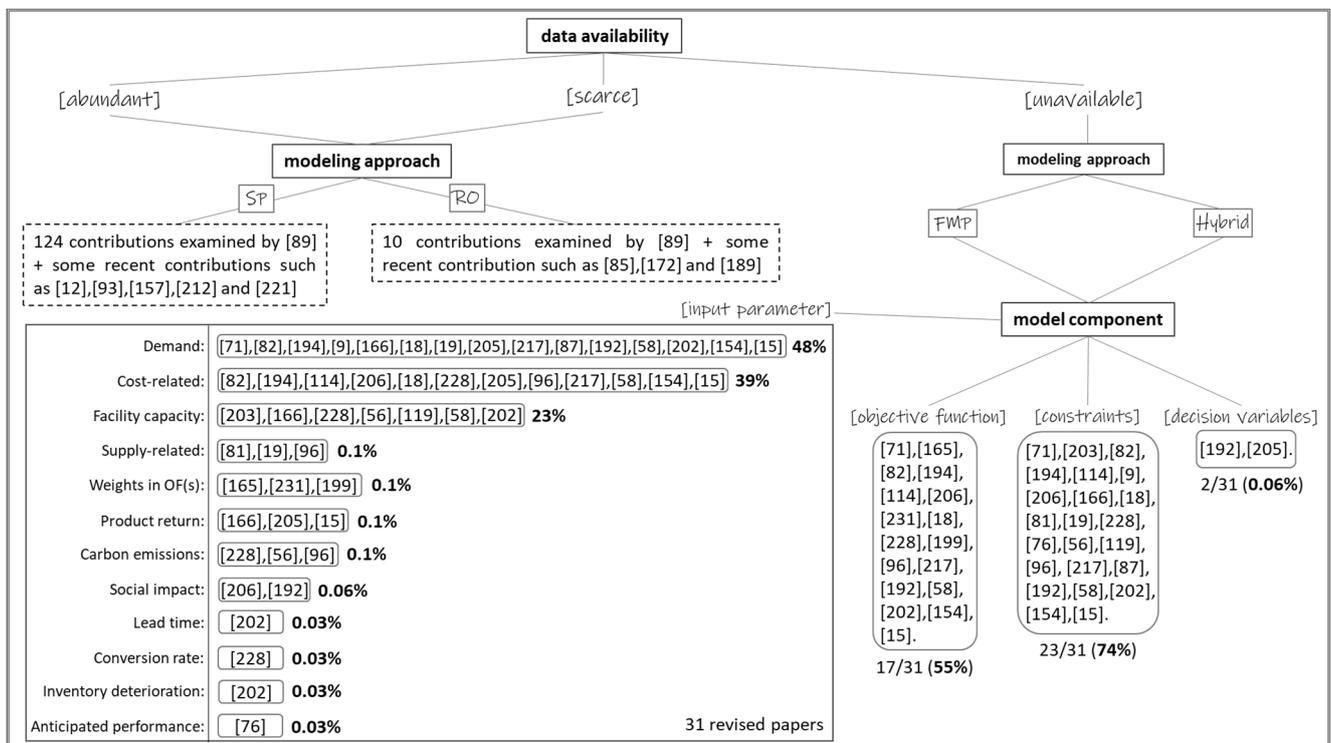
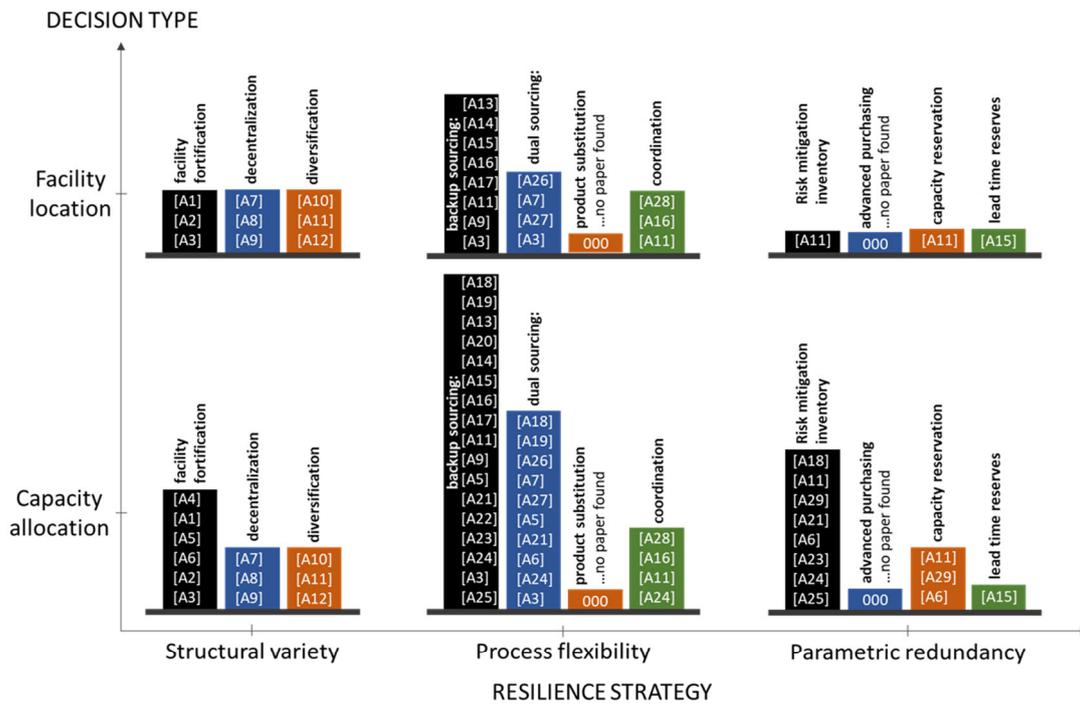


Fig. 5 Decision tree summarizing the DM environments and their respective modeling approaches



Revised articles:

Diabat et al. (2019) [A1]; Samani & Hosseini-Motlagh [A2]; Gholami-Zanjani et al. (2021) [A3]; Fattahi et al. (2017) [A4]; Jabbarzadeh et al. (2018a) [A5]; Alikhani et al. (2021) [A6]; Hasani et al. (2021) [A7]; Haeri et al. (2020) [A8]; Rajesh (2020) [A9]; Ghavamifar et al. (2018) [A10]; Yavari & Zaker (2020) [A11]; Kungwalsong et al. (2022) [A12]; Margolis et al. (2018) [A13]; Ghomi-Avili et al. (2018) [A14]; Sazvar et al. (2021) [A15]; Mehrjerdi & Shafiee (2021) [A16]; Jabbarzadeh et al. (2018b) [A17]; Rezapour et al. (2017) [A18]; Behzadi et al. (2017) [A19]; Kristianto et al. (2014) [A20]; Sabouhi et al. (2018) [A21]; Fattahi et al. (2020) [A22]; Sawik (2022) [A23]; Namdar et al. (2018) [A24]; Tucker et al. (2020) [A25]; Yavari & Zaker (2019) [A26]; Haghjoo et al. (2020) [A27]; Pariazar & Sir (2018) [A28]; Taleizadeh et al. (2022) [A29]

Fig. 6 Review of resilience strategies applied in disruptive supply chains

□ **All revised/numbered references**

- [1] Agrawal, V. V., & Bellos, I. (2016). Servicizing in supply chains and environmental implications. In A. Atasu (Ed.), *Environmentally Responsible supply chains* (pp. 109–124). Cham: Springer. https://doi.org/10.1007/978-3-319-30094-8_7
- [2] Ahmadi, M., Seifi, A., & Tootooni, B. (2015). A humanitarian logistics model for disaster relief operation considering network failure and standard relief time: A case study on San Francisco district. *Transportation Research Part E: Logistics and Transportation Review*, 75, 145–163. <https://doi.org/10.1016/j.tre.2015.01.008>
- [3] Ahmadi-Javid, A., Seyedi, P., & Syam, S. S. (2017). A survey of healthcare facility location. *Computers & Operations Research*, 79, 223–263. <https://doi.org/10.1016/j.cor.2016.05.018>
- [4] Akçalı, E., Çetinkaya, S., & Üster, H. (2009). Network design for reverse and closed-loop supply chains: An annotated bibliography of models and solution approaches. *Networks*, 53(3), 231–248. <https://doi.org/10.1002/net.20267>
- [5] Alikhani, R., Torabi, S. A., & Altay, N. (2021). Retail supply chain network design with concurrent resilience capabilities. *International Journal of Production Economics*, 234, 108042. <https://doi.org/10.1016/j.ijpe.2021.108042>

- [6] Allaoui, H., Guo, Y., Choudhary, A., & Bloemhof, J. (2018). Sustainable agro-food supply chain design using two-stage hybrid multi-objective decision-making approach. *Computers & Operations Research*, 89, 369–384. <https://doi.org/10.1016/j.cor.2016.10.012>
- [7] Alumur, S., Kara, B., & Melo, M. T. (2015). Location and logistics. In G. Laporte, S. Nickel, & F. Saldanha da Gama (Eds.), *Location Science* (1st ed., pp. 419–441). Cham: Springer. https://doi.org/10.1007/978-3-319-13111-5_16
- [8] Alumur, S. A., & Bektaş, T. (2019). Green location problems. In G. Laporte, S. Nickel, & F. Saldanha da Gama (Eds.), *Location Science* (2nd ed., pp. 611–630). Cham: Springer. https://doi.org/10.1007/978-3-030-32177-2_20
- [9] Amin, S. H., & Baki, F. (2017). A facility location model for global closed-loop supply chain network design. *Applied Mathematical Modelling*, 41, 316–330. <https://doi.org/10.1016/j.apm.2016.08.030>
- [10] Anvari, S., & Turkay, M. (2017). The facility location problem from the perspective of triple bottom line accounting of sustainability. *International Journal of Production Research*, 55(21), 6266–6287. <https://doi.org/10.1080/00207543.2017.1341064>
- [11] Arampantzi, C., & Minis, I. (2017). A new model for designing sustainable supply chain networks and its application to a global manufacturer. *Journal of Cleaner Production*, 156, 276–292. <https://doi.org/10.1016/j.jclepro.2017.03.164>
- [12] Aranguren, M., Castillo-Villar, K. K., & Aboytes-Ojeda, M. (2021). A two-stage stochastic model for co-firing biomass supply chain networks. *Journal of Cleaner Production*, 319, 128582. <https://doi.org/10.1016/j.jclepro.2021.128582>
- [13] Arora, N., Charm, T., Grimmelt, A., Ortega, M., Robinson, K., Sexauer, C., & Yamakawa, N. (2020). A global view of how consumer behavior is changing amid COVID-19. *McKinsey and Company*.
- [14] Arslan, A. N., Klibi, W., & Montreuil, B. (2021). Distribution network deployment for omnichannel retailing. *European Journal of Operational Research*, 294(3), 1042–1058. <https://doi.org/10.1016/j.ejor.2020.04.016>
- [15] Atabaki, M. S., Mohammadi, M., & Naderi, B. (2020). New robust optimization models for closed-loop supply chain of durable products: Towards a circular economy. *Computers & Industrial Engineering*, 146, 106520. <https://doi.org/10.1016/j.cie.2020.106520>
- [16] Avgerinos, I., Mourtos, I., & Zois, G. (2022). Multi-type facility location in printing and parcel delivery services. *Annals of Operations Research*, 309, 365–393. <https://doi.org/10.1007/s10479-021-04469-3>
- [17] Azadegan, A., Mellat Parast, M., Lucianetti, L., Nishant, R., & Blackhurst, J. (2020). Supply chain disruptions and business continuity: An empirical assessment. *Decision Sciences*, 51(1), 38–73. <https://doi.org/10.1111/dec.12395>
- [18] Babazadeh, R., Ghaderi, H., & Pishvae, M. S. (2019). A benders-local branching algorithm for second-generation biodiesel supply chain network design under epistemic uncertainty. *Computers & Chemical Engineering*, 124, 364–380. <https://doi.org/10.1016/j.compchemeng.2019.01.013>
- [19] Bairamzadeh, S., Saidi-Mehrabad, M., & Pishvae, M. S. (2018). Modelling different types of uncertainty in biofuel supply network design and planning: A robust optimization approach. *Renewable Energy*, 116, 500–517. <https://doi.org/10.1016/j.renene.2017.09.020>
- [20] BCI. (2018). *Supply chain resilience report 2018, 10th annual survey, & facts*. Retrieved 26 April, 2022, from <https://www.thebci.org/static/uploaded/c50072bf-df5c-4c98-a5e1876aafb15bd0.pdf>.
- [21] Behzadi, G., O’Sullivan, M. J., & Olsen, T. L. (2020). On metrics for supply chain resilience. *European Journal of Operational Research*, 287(1), 145–158. <https://doi.org/10.1016/j.ejor.2020.04.040>
- [22] Behzadi, G., O’Sullivan, M. J., Olsen, T. L., Scrimgeour, F., & Zhang, A. (2017). Robust and resilient strategies for managing supply disruptions in an agribusiness supply chain. *International Journal of Production Economics*, 191, 207–220. <https://doi.org/10.1016/j.ijpe.2017.06.018>

- [23] Beresnev, V., & Melnikov, A. (2018). Exact method for the capacitated competitive facility location problem. *Computers & Operations Research*, 95, 73–82. <https://doi.org/10.1016/j.cor.2018.02.013>
- [24] Biajoli, F. L., Chaves, A. A., & Lorena, L. A. N. (2019). A biased random-key genetic algorithm for the two-stage capacitated facility location problem. *Expert Systems with Applications*, 115, 418–426. <https://doi.org/10.1016/j.eswa.2018.08.024>
- [25] Bijmolt, T. H., Broekhuis, M., De Leeuw, S., Hirche, C., Rooderkerk, R. P., Sousa, R., & Zhu, S. X. (2021). Challenges at the marketing-operations interface in omni-channel retail environments. *Journal of Business Research*, 122, 864–874. <https://doi.org/10.1016/j.jbusres.2019.11.034>
- [26] Biuki, M., Kazemi, A., & Alinezhad, A. (2020). An integrated location-routing-inventory model for sustainable design of a perishable products supply chain network. *Journal of Cleaner Production*, 260, 120842. <https://doi.org/10.1016/j.jclepro.2020.120842>
- [27] Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. *European Journal of Operational Research*, 233(2), 299–312. <https://doi.org/10.1016/j.ejor.2013.09.032>
- [28] Brandenburg, M., & Rebs, T. (2015). Sustainable supply chain management: A modeling perspective. *Annals of Operations Research*, 229(1), 213–252. <https://doi.org/10.1007/s10479-015-1853-1>
- [29] Brandstätter, G., Leitner, M., & Ljubić, I. (2020). Location of charging stations in electric car sharing systems. *Transportation Science*, 54(5), 1408–1438. <https://doi.org/10.1287/trsc.2019.0931>
- [30] Bressanelli, G., Perona, M., & Sacconi, N. (2018). Challenges in supply chain redesign for the circular economy: A literature review and a multiple case study. *International Journal of Production Research*, 57(23), 7395–7422. <https://doi.org/10.1080/00207543.2018.1542176>
- [31] Brimberg, J., Drezner, Z., Mladenović, N., & Salhi, S. (2014). A new local search for continuous location problems. *European Journal of Operational Research*, 232(2), 256–265. <https://doi.org/10.1016/j.ejor.2013.06.022>
- [32] Bubicz, M. E., Barbosa-Póvoa, A. P. F. D., & Carvalho, A. (2019). Incorporating social aspects in sustainable supply chains: Trends and future directions. *Journal of Cleaner Production*, 237, 117500. <https://doi.org/10.1016/j.jclepro.2019.06.331>
- [33] Budak, A. (2020). Sustainable reverse logistics optimization with triple bottom line approach: An integration of disassembly line balancing. *Journal of Cleaner Production*, 270, 122475. <https://doi.org/10.1016/j.jclepro.2020.122475>
- [34] Çalik, H., & Fortz, B. (2019). A Benders decomposition method for locating stations in a one-way electric car sharing system under demand uncertainty. *Transportation Research Part B: Methodological*, 125, 121–150. <https://doi.org/10.1016/j.trb.2019.05.004>
- [35] Calzolari, T., Genovese, A., & Brint, A. (2022). Circular economy indicators for supply chains: A systematic literature review. *Environmental and Sustainability Indicators*, 13, 100160. <https://doi.org/10.1016/j.indic.2021.100160>
- [36] Castro, J., Nasini, S., & Saldanha da Gama, F. (2017). A cutting-plane approach for large-scale capacitated multi-period facility location using a specialized interior-point method. *Mathematical Programming*, 163(1), 411–444. <https://doi.org/10.1007/s10107-016-1067-6>
- [37] Celik Turkoglu, D., & Erol Genevois, M. (2020). A comparative survey of service facility location problems. *Annals of Operations Research*, 292(1), 399–468. <https://doi.org/10.1007/s10479-019-03385-x>
- [38] Chavez, M. M. M., Costa, Y., & Sarache, W. (2021). A three-objective stochastic location-inventory-routing model for agricultural waste-based biofuel supply chain. *Computers & Industrial Engineering*, 162, 107759. <https://doi.org/10.1016/j.cie.2021.107759>
- [39] Chen, J., Liang, Y., Shen, H., Shen, Z.-J. M., & Xue, M. (2021). Offline-channel planning in smart omnichannel retailing. *Manufacturing & Service Operations Management*. <https://doi.org/10.1287/msom.2021.1036>

- [40] Chen, L., Olhager, J., & Tang, O. (2014). Manufacturing facility location and sustainability: A literature review and research agenda. *International Journal of Production Economics*, 149, 154–163. <https://doi.org/10.1016/j.ijpe.2013.05.013>
- [41] Chhibber, D., Bisht, D. C., & Srivastava, P. K. (2021). Pareto-optimal solution for fixed-charge solid transportation problem under intuitionistic fuzzy environment. *Applied Soft Computing*, 107, 107368. <https://doi.org/10.1016/j.asoc.2021.107368>
- [42] Chou, M. C., Liu, Q., Teo, C.-P., & Yeo, D. (2019). Models for effective deployment and redistribution of shared bicycles with location choices. In M. Hu (Ed.), *Sharing Economy* (pp. 409–434). Cham: Springer. https://doi.org/10.1007/978-3-030-01863-4_17
- [43] Coll, N., Fort, M., & Saus, M. (2022). Coverage area maximization with parallel simulated annealing. *Expert Systems with Applications*, 202, 117185. <https://doi.org/10.1016/j.eswa.2022.117185>
- [44] Corberán, A., Landete, M., Peiró, J. & Saldanha da Gama, F. (2020). The facility location problem with capacity transfers. *Transportation Research Part E: Logistics and Transportation Review*, 138, 101943. <https://doi.org/10.1016/j.tre.2020.101943>
- [45] Corcoran, P., & Gagarin, A. (2021). Heuristics for k-domination models of facility location problems in street networks. *Computers & Operations Research*, 133, 105368. <https://doi.org/10.1016/j.cor.2021.105368>
- [46] Correia, I., & Melo, T. (2016). Multi-period capacitated facility location under delayed demand satisfaction. *European Journal of Operational Research*, 255(3), 729–746. <http://dx.doi.org/10.1016/j.ejor.2016.06.039>
- [47] Correia, I., & Melo, T. (2017). A multi-period facility location problem with modular capacity adjustments and flexible demand fulfillment. *Computers & Industrial Engineering*, 110, 307–321. <http://dx.doi.org/10.1016/j.cie.2017.06.003>
- [48] Correia, I., & Melo, T. (2021). Integrated facility location and capacity planning under uncertainty. *Computational & Applied Mathematics*, 40(5), 1–36. <https://doi.org/10.1007/s40314-021-01560-0>
- [49] Correia, I., Melo, T., & Saldanha da Gama, F. (2013). Comparing classical performance measures for a multi-period, two-echelon supply chain network design problem with sizing decisions. *Computers & Industrial Engineering*, 64(1), 366–380. <http://dx.doi.org/10.1016/j.cie.2012.11.001>
- [50] Correia, I., & Saldanha da Gama, F. (2019). Facility location under uncertainty. In G. Laporte, S. Nickel, & F. Saldanha da Gama (Eds.), *Location Science* (2nd ed., pp. 185–213). Cham: Springer. https://doi.org/10.1007/978-3-030-32177-2_8
- [51] Cortinhal, M. J., Lopes, M. J., & Melo, M. T. (2015). Dynamic design and re-design of multi-echelon, multi-product logistics networks with outsourcing opportunities: A computational study. *Computers & Industrial Engineering*, 90, 118–131. <http://dx.doi.org/10.1016/j.cie.2015.08.019>
- [52] Cortinhal, M. J., Lopes, M. J., & Melo, M. T. (2019). A multi-stage supply chain network design problem with in-house production and partial product outsourcing. *Applied Mathematical Modelling*, 70, 572–594. <https://doi.org/10.1016/j.apm.2019.01.046>
- [53] Craighead, C. W., Blackhurst, J., Rungtusanatham, M. J., & Handfield, R. B. (2007). The severity of supply chain disruptions: Design characteristics and mitigation capabilities. *Decision Sciences*, 38(1), 131–156. <https://doi.org/10.1111/j.1540-5915.2007.00151.x>
- [54] Crönert, T., & Minner, S. (2021). Location selection for hydrogen fuel stations under emerging provider competition. *Transportation Research Part C: Emerging Technologies*, 133, 103426. <https://doi.org/10.1016/j.trc.2021.103426>
- [55] Cui, A. S., Zhao, M., & Ravichandran, T. (2011). Market uncertainty and dynamic new product launch strategies: A system dynamics model. *IEEE Transactions on Engineering Management*, 58(3), 530–550. <https://doi.org/10.1109/TEM.2010.2100822>

- [56] Dai, Z., Aqlan, F., Zheng, X., & Gao, K. (2018). A location-inventory supply chain network model using two heuristic algorithms for perishable products with fuzzy constraints. *Computers & Industrial Engineering*, *119*, 338–352. <https://doi.org/10.1016/j.cie.2018.04.007>
- [57] Dalal, J., & Üster, H. (2018). Combining worst case and average case considerations in an integrated emergency response network design problem. *Transportation Science*, *52*(1), 171–188. <https://doi.org/10.1287/trsc.2016.0725>
- [58] Dehghan, E., Nikabadi, M. S., Amiri, M., & Jabbarzadeh, A. (2018). Hybrid robust, stochastic and possibilistic programming for closed-loop supply chain network design. *Computers & Industrial Engineering*, *123*, 220–231. <https://doi.org/10.1016/j.cie.2018.06.030>
- [59] Devika, K., Jafarian, A., & Nourbakhsh, V. (2014). Designing a sustainable closed-loop supply chain network based on triple bottom line approach: A comparison of metaheuristics hybridization techniques. *European Journal of Operational Research*, *235*(3), 594–615. <https://doi.org/10.1016/j.ejor.2013.12.032>
- [60] Diabat, A., Jabbarzadeh, A., & Khosrojerdi, A. (2019). A perishable product supply chain network design problem with reliability and disruption considerations. *International Journal of Production Economics*, *212*, 125–138. <https://doi.org/10.1016/j.ijpe.2018.09.018>
- [61] Dolgui, A., Ivanov, D., & Sokolov, B. (2018). Ripple effect in the supply chain: An analysis and recent literature. *International Journal of Production Research*, *56*(1-2), 414–430. <https://doi.org/10.1080/00207543.2017.1387680>
- [62] Dönmez, Z., Kara, B. Y., Karsu, Ö., & Saldanha da Gama, F. (2021). Humanitarian facility location under uncertainty: Critical review and future prospects. *Omega*, *102*, 102393. <https://doi.org/10.1016/j.omega.2021.102393>
- [63] Elçi, Ö., & Noyan, N. (2018). A chance-constrained two-stage stochastic programming model for humanitarian relief network design. *Transportation Research Part B: Methodological*, *108*, 55–83. <https://doi.org/10.1016/j.trb.2017.12.002>
- [64] Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Oxford: Capstone Publishing Ltd.
- [65] Eriskin, L., Karatas, M., & Zheng, Y.-J. (2022). A robust multi-objective model for healthcare resource management and location planning during pandemics. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-022-04760-x>
- [66] Eskandarpour, M., Dejax, P., Miemczyk, J., & Péton, O. (2015). Sustainable supply chain network design: An optimization-oriented review. *Omega*, *54*, 11–32. <https://doi.org/10.1016/j.omega.2015.01.006>
- [67] Farahani, R. Z., Asgari, N., Heidari, N., Hosseini, M., & Goh, M. (2012). Covering problems in facility location: A review. *Computers & Industrial Engineering*, *62*(1), 368–407. <https://doi.org/10.1016/j.cie.2011.08.020>
- [68] Farahani, R. Z., Fallah, S., Ruiz, R., Hosseini, S., & Asgari, N. (2019). OR models in urban service facility location: A critical review of applications and future developments. *European Journal of Operational Research*, *276*(1), 1–27. <https://doi.org/10.1016/j.ejor.2018.07.036>
- [69] Farahani, R. Z., Hekmatfar, M., Fahimnia, B., & Kazemzadeh, N. (2014). Hierarchical facility location problem: Models, classifications, techniques, and applications. *Computers & Industrial Engineering*, *68*, 104–117. <https://doi.org/10.1016/j.cie.2013.12.005>
- [70] Farahani, R. Z., SteadieSeifi, M., & Asgari, N. (2010). Multiple criteria facility location problems: A survey. *Applied Mathematical Modelling*, *34*(7), 1689–1709. <https://doi.org/10.1016/j.apm.2009.10.005>
- [71] Farrokh, M., Azar, A., Jandaghi, G., & Ahmadi, E. (2018). A novel robust fuzzy stochastic programming for closed loop supply chain network design under hybrid uncertainty. *Fuzzy Sets and Systems*, *341*, 69–91. <https://doi.org/10.1016/j.fss.2017.03.019>

- [72] Fattahi, M., & Govindan, K. (2018). A multi-stage stochastic program for the sustainable design of biofuel supply chain networks under biomass supply uncertainty and disruption risk: A real-life case study. *Transportation Research Part E: Logistics and Transportation Review*, 118, 534–567. <https://doi.org/10.1016/j.tre.2018.08.008>
- [73] Fattahi, M., Govindan, K., & Farhadkhani, M. (2021). Sustainable supply chain planning for biomass-based power generation with environmental risk and supply uncertainty considerations: A real-life case study. *International Journal of Production Research*, 59(10), 3084–3108. <https://doi.org/10.1080/00207543.2020.1746427>
- [74] Fattahi, M., Govindan, K., & Keyvanshokoo, E. (2017). Responsive and resilient supply chain network design under operational and disruption risks with delivery lead-time sensitive customers. *Transportation Research Part E: Logistics and Transportation Review*, 101, 176–200. <https://doi.org/10.1016/j.tre.2017.02.004>
- [75] Fattahi, M., Govindan, K., & Maihami, R. (2020). Stochastic optimization of disruption-driven supply chain network design with a new resilience metric. *International Journal of Production Economics*, 230, 107755. <https://doi.org/10.1016/j.ijpe.2020.107755>
- [76] Feitó-Cespón, M., Costa, Y., Pishvae, M. S., & Cespón-Castro, R. (2021). A fuzzy inference based scenario building in two-stage optimization framework for sustainable recycling supply chain redesign. *Expert Systems with Applications*, 165, 113906. <https://doi.org/10.1016/j.eswa.2020.113906>
- [77] Feitó-Cespón, M., Sarache, W., Piedra-Jimenez, F., & Cespón-Castro, R. (2017). Redesign of a sustainable reverse supply chain under uncertainty: A case study. *Journal of Cleaner Production*, 151, 206–217. <https://doi.org/10.1016/j.jclepro.2017.03.057>
- [78] Filippi, C., Guastaroba, G., Huerta-Muñoz, D., & Speranza, M. (2021). A kernel search heuristic for a fair facility location problem. *Computers & Operations Research*, 132, 105292. <https://doi.org/10.1016/j.cor.2021.105292>
- [79] Gao, X., & Cao, C. (2020). A novel multi-objective scenario-based optimization model for sustainable reverse logistics supply chain network redesign considering facility reconstruction. *Journal of Cleaner Production*, 270, 122405. <https://doi.org/10.1016/j.jclepro.2020.122405>
- [80] German Federal Ministry of Labour and Social Affairs. (2021). *Supply Chain Act*. Retrieved 21 May, 2022, from <https://www.csr-in-deutschland.de/EN/Business-Human-Rights/Supply-Chain-Act/supply-chain-act.html>.
- [81] Ghaderi, H., Moini, A., & Pishvae, M. S. (2018). A multi-objective robust possibilistic programming approach to sustainable switchgrass-based bioethanol supply chain network design. *Journal of Cleaner Production*, 179, 368–406. <https://doi.org/10.1016/j.jclepro.2017.12.218>
- [82] Ghahremani-Nahr, J., Kian, R., & Sabet, E. (2019). A robust fuzzy mathematical programming model for the closed-loop supply chain network design and a whale optimization solution algorithm. *Expert Systems with Applications*, 116, 454–471. <https://doi.org/10.1016/j.eswa.2018.09.027>
- [83] Ghavamifar, A., Makui, A., & Taleizadeh, A. A. (2018). Designing a resilient competitive supply chain network under disruption risks: A real-world application. *Transportation Research Part E: Logistics and Transportation Review*, 115, 87–109. <https://doi.org/10.1016/j.tre.2018.04.014>
- [84] Gholami-Zanjani, S. M., Klibi, W., Jabalameli, M. S., & Pishvae, M. S. (2021). The design of resilient food supply chain networks prone to epidemic disruptions. *International Journal of Production Economics*, 233, 108001. <https://doi.org/10.1016/j.ijpe.2020.108001>
- [85] Gholizadeh, H., & Fazlollahtabar, H. (2020). Robust optimization and modified genetic algorithm for a closed loop green supply chain under uncertainty: Case study in melting industry. *Computers & Industrial Engineering*, 147, 106653. <https://doi.org/10.1016/j.cie.2020.106653>
- [86] Ghomi-Avili, M., Naeini, S. G. J., Tavakkoli-Moghaddam, R., & Jabbarzadeh, A. (2018). A fuzzy pricing model for a green competitive closed-loop supply chain network design in the presence of disruptions. *Journal of Cleaner Production*, 188, 425–442. <https://doi.org/10.1016/j.jclepro.2018.03.273>

- [87] Giallanza, A., & Puma, G. L. (2020). Fuzzy green vehicle routing problem for designing a three echelons supply chain. *Journal of Cleaner Production*, 259, 120774. <https://doi.org/10.1016/j.jclepro.2020.120774>
- [88] Govindan, K., & Fattahi, M. (2017). Investigating risk and robustness measures for supply chain network design under demand uncertainty: A case study of glass supply chain. *International Journal of Production Economics*, 183, 680–699. <https://doi.org/10.1016/j.ijpe.2015.09.033>
- [89] Govindan, K., Fattahi, M., & Keyvanshokoo, E. (2017). Supply chain network design under uncertainty: A comprehensive review and future research directions. *European Journal of Operational Research*, 263(1), 108–141. <https://doi.org/10.1016/j.ejor.2017.04.009>
- [90] Govindan, K., Jafarian, A., & Nourbakhsh, V. (2019). Designing a sustainable supply chain network integrated with vehicle routing: A comparison of hybrid swarm intelligence metaheuristics. *Computers & Operations Research*, 110, 220–235. <https://doi.org/10.1016/j.cor.2018.11.013>
- [91] Govindan, K., Soleimani, H., & Kannan, D. (2015). Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. *European Journal of Operational Research*, 240(3), 603–626. <https://doi.org/10.1016/j.ejor.2014.07.012>
- [92] Guerrero-Lorente, J., Gabor, A. F., & Ponce-Cueto, E. (2020). Omnichannel logistics network design with integrated customer preference for deliveries and returns. *Computers & Industrial Engineering*, 144, 106433. <https://doi.org/10.1016/j.cie.2020.106433>
- [93] Guo, C., Hu, H., Wang, S., Rodriguez, L. F., Ting, K., & Lin, T. (2022). Multiperiod stochastic programming for biomass supply chain design under spatiotemporal variability of feedstock supply. *Renewable Energy*, 186, 378–393. <https://doi.org/10.1016/j.renene.2021.12.144>
- [94] Guo, Y., Yu, J., Allaoui, H., & Choudhary, A. (2022). Lateral collaboration with cost-sharing in sustainable supply chain optimisation: A combinatorial framework. *Transportation Research Part E: Logistics and Transportation Review*, 157, 102593. <https://doi.org/10.1016/j.tre.2021.102593>
- [95] Guo, Y., Yu, J., Boulaksil, Y., Allaoui, H., & Hu, F. (2021). Solving the sustainable supply chain network design problem by the multi-neighborhoods descent traversal algorithm. *Computers & Industrial Engineering*, 154, 107098. <https://doi.org/10.1016/j.cie.2021.107098>
- [96] Habib, M. S., Asghar, O., Hussain, A., Imran, M., Mughal, M. P., & Sarkar, B. (2021). A robust possibilistic programming approach toward animal fat-based biodiesel supply chain network design under uncertain environment. *Journal of Cleaner Production*, 278, 122403. <https://doi.org/10.1016/j.jclepro.2020.122403>
- [97] Haeri, A., Hosseini-Motlagh, S.-M., Ghatreh Samani, M. R., & Rezaei, M. (2020). A mixed resilient-efficient approach toward blood supply chain network design. *International Transactions in Operational Research*, 27(4), 1962–2001. <https://doi.org/10.1111/itor.12714>
- [98] Haghjoo, N., Tavakkoli-Moghaddam, R., Shahmoradi-Moghaddam, H., & Rahimi, Y. (2020). Reliable blood supply chain network design with facility disruption: A real-world application. *Engineering Applications of Artificial Intelligence*, 90, 103493. <https://doi.org/10.1016/j.engappai.2020.103493>
- [99] Hartmann, T. A., Lendl, S., & Woeginger, G. J. (2022). Continuous facility location on graphs. *Mathematical Programming*, 192(1), 207–227. <https://doi.org/10.1007/s10107-021-01646-x>
- [100] Hasani, A., Mokhtari, H., & Fattahi, M. (2021). A multi-objective optimization approach for green and resilient supply chain network design: A real-life case study. *Journal of Cleaner Production*, 278, 123199. <https://doi.org/10.1016/j.jclepro.2020.123199>
- [101] Hendricks, K. B., & Singhal, V. R. (2005). An empirical analysis of the effect of supply chain disruptions on long-run stock price performance and equity risk of the firm. *Production and Operations Management*, 14(1), 35–52. <https://doi.org/10.1111/j.1937-5956.2005.tb00008.x>
- [102] Hosseini, S., Ivanov, D., & Dolgui, A. (2019). Review of quantitative methods for supply chain resilience analysis. *Transportation Research Part E: Logistics and Transportation Review*, 125, 285–307. <https://doi.org/10.1016/j.tre.2019.03.001>

- [103] International Organization for Standardization. (2010). *ISO 26000*. Retrieved 20 May, 2022, from <https://www.iso.org/iso-26000-social-responsibility.html>.
- [104] Ishfaq, R., & Bajwa, N. (2019). Profitability of online order fulfillment in multi-channel retailing. *European Journal of Operational Research*, 272(3), 1028–1040. <https://doi.org/10.1016/j.ejor.2018.07.047>
- [105] Ishfaq, R., Davis-Sramek, B., & Gibson, B. (2021). Digital supply chains in omnichannel retail: A conceptual framework. *Journal of Business Logistics*, 43(2), 169–188. <https://doi.org/10.1111/jbl.12277>
- [106] Ishfaq, R., Defee, C. C., Gibson, B. J., & Raja, U. (2016). Realignment of the physical distribution process in omni-channel fulfillment. *International Journal of Physical Distribution & Logistics Management*, 6(6-7), 543–561. <https://doi.org/10.1108/IJPDLM-02-2015-0032>
- [107] Islam, M. T., & Huda, N. (2018). Reverse logistics and closed-loop supply chain of waste electrical and electronic equipment (WEEE)/E-waste: A comprehensive literature review. *Resources, Conservation & Recycling*, 137, 48–75. <https://doi.org/10.1016/j.resconrec.2018.05.026>
- [108] Ivanov, D. (2017). Simulation-based ripple effect modelling in the supply chain. *International Journal of Production Research*, 55(7), 2083–2101. <https://doi.org/10.1080/00207543.2016.1275873>
- [109] Ivanov, D., & Dolgui, A. (2019). Low-certainty-need (LCN) supply chains: A new perspective in managing disruption risks and resilience. *International Journal of Production Research*, 57(15-16), 5119–5136. <https://doi.org/10.1080/00207543.2018.1521025>
- [110] Ivanov, D., Tsipoulanidis, A., & Schönberger, J. (2021). *Global supply chain and operations management: A decision-oriented introduction to the creation of value* (3rd ed.). Cham: Springer. <https://doi.org/10.1007/978-3-030-72331-6>
- [111] Jabbarzadeh, A., Fahimnia, B., & Sabouhi, F. (2018). Resilient and sustainable supply chain design: Sustainability analysis under disruption risks. *International Journal of Production Research*, 56(17), 5945–5968. <https://doi.org/10.1080/00207543.2018.1461950>
- [112] Jabbarzadeh, A., Fahimnia, B., & Seuring, S. (2014). Dynamic supply chain network design for the supply of blood in disasters: A robust model with real world application. *Transportation Research Part E: Logistics and Transportation Review*, 70, 225–244. <https://doi.org/10.1016/j.tre.2014.06.003>
- [113] Jabbarzadeh, A., Houghton, M., & Khosrojerdi, A. (2018). Closed-loop supply chain network design under disruption risks: A robust approach with real world application. *Computers & Industrial Engineering*, 116, 178–191. <https://doi.org/10.1016/j.cie.2017.12.025>
- [114] Jindal, A., & Sangwan, K. S. (2017). Multi-objective fuzzy mathematical modelling of closed-loop supply chain considering economical and environmental factors. *Annals of Operations Research*, 257(1), 95–120. <https://doi.org/10.1007/s10479-016-2219-z>
- [115] Jouzdani, J., & Govindan, K. (2021). On the sustainable perishable food supply chain network design: A dairy products case to achieve sustainable development goals. *Journal of Cleaner Production*, 278, 123060. <https://doi.org/10.1016/j.jclepro.2020.123060>
- [116] Jüttner, U., & Maklan, S. (2011). Supply chain resilience in the global financial crisis: An empirical study. *Supply Chain Management*, 16(4), 246–259. <https://doi.org/10.1108/13598541111139062>
- [117] Kembro, J., Eriksson, E., & Norrman, A. (2022). Sorting out the sorting in omnichannel retailing. *Journal of Business Logistics*. <https://doi.org/10.1111/jbl.12305>
- [118] Khajavi, S. H., Partanen, J., Holmström, J., & Tuomi, J. (2015). Risk reduction in new product launch: A hybrid approach combining direct digital and tool-based manufacturing. *Computers in Industry*, 74, 29–42. <https://doi.org/10.1016/j.compind.2015.08.008>
- [119] Khalifehzadeh, S., & Fakhrzad, M. B. (2019). A modified firefly algorithm for optimizing a multi stage supply chain network with stochastic demand and fuzzy production capacity. *Computers & Industrial Engineering*, 133, 42–56. <https://doi.org/10.1016/j.cie.2019.04.048>

- [120] Khalilpourazari, S., & Arshadi Khamseh, A. (2019). Bi-objective emergency blood supply chain network design in earthquake considering earthquake magnitude: A comprehensive study with real world application. *Annals of Operations Research*, 283(1), 355–393. <https://doi.org/10.1007/s10479-017-2588-y>
- [121] Kheirabadi, M., Naderi, B., Arshadikhamseh, A., & Roshanaei, V. (2019). A mixed-integer program and a Lagrangian-based decomposition algorithm for the supply chain network design with quantity discount and transportation modes. *Expert Systems with Applications*, 137, 504–516. <https://doi.org/10.1016/j.eswa.2019.07.004>
- [122] Kristianto, Y., Gunasekaran, A., Helo, P., & Hao, Y. (2014). A model of resilient supply chain network design: A two-stage programming with fuzzy shortest path. *Expert Systems with Applications*, 41(1), 39–49. <https://doi.org/10.1016/j.eswa.2013.07.009>
- [123] Kungwalsong, K., Mendoza, A., Kamath, V., Pazhani, S., & Marmolejo-Saucedo, J. A. (2022). An application of interactive fuzzy optimization model for redesigning supply chain for resilience. *Annals of Operations Research*, 315, 1803–1839. <https://doi.org/10.1007/s10479-022-04542-5>
- [124] Laporte, G., Meunier, F., & Wolfler Calvo, R. (2018). Shared mobility systems: An updated survey. *Annals of Operations Research*, 271(1), 105–126. <https://doi.org/10.1007/s10479-018-3076-8>
- [125] Laporte, G., Nickel, S., & Saldanha da Gama, F. (2019). Introduction to location science. In G. Laporte, S. Nickel, & F. Saldanha da Gama (Eds.), *Location Science* (2nd ed., pp. 1–21). Cham: Springer. https://doi.org/10.1007/978-3-030-32177-2_1
- [126] Lee, C. (2017). A GA-based optimisation model for big data analytics supporting anticipatory shipping in Retail 4.0. *International Journal of Production Research*, 55(2), 593–605. <https://doi.org/10.1080/00207543.2016.1221162>
- [127] Li, G., Liu, J., & Giordano, A. (2022). Robust optimization of construction waste disposal facility location considering uncertain factors. *Journal of Cleaner Production*, 353, 131455. <https://doi.org/10.1016/j.jclepro.2022.131455>
- [128] Lin, J.-R., & Yang, T.-H. (2011). Strategic design of public bicycle sharing systems with service level constraints. *Transportation Research Part E: Logistics and Transportation Review*, 47(2), 284–294. <https://doi.org/10.1016/j.tre.2010.09.004>
- [129] Lin, Y., Jia, H., Yang, Y., Tian, G., Tao, F., & Ling, L. (2018). An improved artificial bee colony for facility location allocation problem of end-of-life vehicles recovery network. *Journal of Cleaner Production*, 205, 134–144. <https://doi.org/10.1016/j.jclepro.2018.09.086>
- [130] Liu, K., Zhou, Y., & Zhang, Z. (2010). Capacitated location model with online demand pooling in a multi-channel supply chain. *European Journal of Operational Research*, 207(1), 218–231. <https://doi.org/10.1016/j.ejor.2010.04.029>
- [131] Lohmer, J., Bugert, N., & Lasch, R. (2020). Analysis of resilience strategies and ripple effect in blockchain-coordinated supply chains: An agent-based simulation study. *International Journal of Production Economics*, 228, 107882. <https://doi.org/10.1016/j.ijpe.2020.107882>
- [132] Mahar, S., & Wright, P. D. (2017). In-store pickup and returns for a dual channel retailer. *IEEE Transactions on Engineering Management*, 64(4), 491–504. <https://doi.org/10.1109/TEM.2017.2691466>
- [133] MahmoudGonbadi, A., Genovese, A., & Sgalambro, A. (2021). Closed-loop supply chain design for the transition towards a circular economy: A systematic literature review of methods, applications and current gaps. *Journal of Cleaner Production*, 323, 129101. <https://doi.org/10.1016/j.jclepro.2021.129101>
- [134] Mara, S. T. W., Kuo, R., & Asih, A. M. S. (2021). Location-routing problem: A classification of recent research. *International Transactions in Operational Research*, 28(6), 2941–2983. <https://doi.org/10.1111/itor.12950>
- [135] Margolis, J. T., Sullivan, K. M., Mason, S. J., & Magagnotti, M. (2018). A multi-objective optimization model for designing resilient supply chain networks. *International Journal of Production Economics*, 204, 174–185. <https://doi.org/10.1016/j.ijpe.2018.06.008>

- [136] Martins, C. L., Melo, M. T., & Pato, M. V. (2019). Redesigning a food bank supply chain network in a triple bottom line context. *International Journal of Production Economics*, 214, 234–247. <https://doi.org/10.1016/j.ijpe.2018.11.011>
- [137] Mehrjerdi, Y. Z., & Shafiee, M. (2021). A resilient and sustainable closed-loop supply chain using multiple sourcing and information sharing strategies. *Journal of Cleaner Production*, 289, 125141. <https://doi.org/10.1016/j.jclepro.2020.125141>
- [138] Melacini, M., Perotti, S., Rasini, M., & Tappia, E. (2018). E-fulfilment and distribution in omni-channel retailing: A systematic literature review. *International Journal of Physical Distribution & Logistics Management*, 48(4), 391–414. <https://doi.org/10.1108/IJPDLM-02-2017-0101>
- [139] Melnyk, S. A., Closs, D. J., Griffis, S. E., Zobel, C. W., & Macdonald, J. R. (2014). Understanding supply chain resilience. *Supply Chain Management Review*, 18(1), 34–41.
- [140] Melo, M. T., Nickel, S., & Saldanha da Gama, F. (2009). Facility location and supply chain management: A review. *European Journal of Operational Research*, 196(2), 401–412. <https://doi.org/10.1016/j.ejor.2008.05.007>
- [141] Melo, M. T., Nickel, S., & Saldanha da Gama, F. (2012). A tabu search heuristic for redesigning a multi-echelon supply chain network over a planning horizon. *International Journal of Production Economics*, 136(1), 218–230. <https://dx.doi.org/10.1016/j.ijpe.2011.11.022>
- [142] Millstein, M. A., Bilir, C., & Campbell, J. F. (2022). The effect of optimizing warehouse locations on omnichannel designs. *European Journal of Operational Research*, 301(2), 576–590. <https://doi.org/10.1016/j.ejor.2021.10.061>
- [143] Millstein, M. A., & Campbell, J. F. (2018). Total hockey optimizes omnichannel facility locations. *Interfaces*, 48(4), 340–356. <https://doi.org/10.1287/inte.2018.0942>
- [144] Mishra, D., Kumar, S., & Hassini, E. (2019). Current trends in disaster management simulation modelling research. *Annals of Operations Research*, 283(1), 1387–1411. <https://doi.org/10.1007/s10479-018-2985-x>
- [145] Moheb-Alizadeh, H., Handfield, R., & Warsing, D. (2021). Efficient and sustainable closed-loop supply chain network design: A two-stage stochastic formulation with a hybrid solution methodology. *Journal of Cleaner Production*, 308, 127323. <https://doi.org/10.1016/j.jclepro.2021.127323>
- [146] Moradi, A., Razmi, J., Babazadeh, R., & Sabbaghnia, A. (2019). An integrated principal component analysis and multi-objective mathematical programming approach to agile supply chain network design under uncertainty. *Journal of Industrial and Management Optimization*, 15(2), 855–879. <http://dx.doi.org/10.3934/jimo.2018074>
- [147] Mota, B., Gomes, M. I., Carvalho, A., & Barbosa-Póvoa, A. P. (2015). Towards supply chain sustainability: Economic, environmental and social design and planning. *Journal of Cleaner Production*, 105, 14–27. <https://doi.org/10.1016/j.jclepro.2014.07.052>
- [148] Mota, B., Gomes, M. I., Carvalho, A., & Barbosa-Póvoa, A. P. (2018). Sustainable supply chains: An integrated modeling approach under uncertainty. *Omega*, 77, 32–57. <https://doi.org/10.1016/j.omega.2017.05.006>
- [149] Mula, J., Poler, R., & Garcia, J. (2006). MRP with flexible constraints: A fuzzy mathematical programming approach. *Fuzzy Sets and Systems*, 157(1), 74–97. <https://doi.org/10.1016/j.fss.2005.05.045>
- [150] Muren, Li, H., Mukhopadhyay, S. K., Wu, J.-J., Zhou, L., & Du, Z. (2020). Balanced maximal covering location problem and its application in bike-sharing. *International Journal of Production Economics*, 223, 107513. <https://doi.org/10.1016/j.ijpe.2019.09.034>
- [151] Naderi, M. J., Pishvaei, M. S., & Torabi, S. A. (2016). Applications of fuzzy mathematical programming approaches in supply chain planning problems. In C. Kahraman, U. Kaymak, & A. Yazici (Eds.), *Fuzzy Logic in its 50th Year* (pp. 369–402). Cham: Springer. https://doi.org/10.1007/978-3-319-31093-0_16

- [152] Nakao, H., Shen, S., & Chen, Z. (2017). Network design in scarce data environment using moment-based distributionally robust optimization. *Computers & Operations Research*, 88, 44–57. <https://doi.org/10.1016/j.cor.2017.07.002>
- [153] Namdar, J., Li, X., Sawhney, R., & Pradhan, N. (2018). Supply chain resilience for single and multiple sourcing in the presence of disruption risks. *International Journal of Production Research*, 56(6), 2339–2360. <https://doi.org/10.1080/00207543.2017.1370149>
- [154] Nayeri, S., Paydar, M. M., Asadi-Gangraj, E., & Emami, S. (2020). Multi-objective fuzzy robust optimization approach to sustainable closed-loop supply chain network design. *Computers & Industrial Engineering*, 148, 106716. <https://doi.org/10.1016/j.cie.2020.106716>
- [155] Nayeri, S., Tavakoli, M., Tanhaeean, M., & Jolai, F. (2022). A robust fuzzy stochastic model for the responsive-resilient inventory-location problem: Comparison of metaheuristic algorithms. *Annals of Operations Research*, 315, 1895–1935. <https://doi.org/10.1007/s10479-021-03977-6>
- [156] Ni, W., Shu, J., Song, M., Xu, D., & Zhang, K. (2021). A branch-and-price algorithm for facility location with general facility cost functions. *INFORMS Journal on Computing*, 33(1), 86–104. <https://doi.org/10.1287/ijoc.2019.0921>
- [157] Nur, F., Aboytes-Ojeda, M., Castillo-Villar, K. K., & Marufuzzaman, M. (2021). A two-stage stochastic programming model for biofuel supply chain network design with biomass quality implications. *IIE Transactions*, 53(8), 845–868. <https://doi.org/10.1080/24725854.2020.1751347>
- [158] Omar, I. A., Debe, M., Jayaraman, R., Salah, K., Omar, M., & Arshad, J. (2022). Blockchain-based supply chain traceability for COVID-19 personal protective equipment. *Computers & Industrial Engineering*, 167, 107995. <https://doi.org/10.1016/j.cie.2022.107995>
- [159] Omid, S., & Fathali, J. (2022). Inverse single facility location problem on a tree with balancing on the distance of server to clients. *Journal of Industrial and Management Optimization*, 18(2), 1247. <http://dx.doi.org/10.3934/jimo.2021017>
- [160] Ortiz-Astorquiza, C., Contreras, I., & Laporte, G. (2018). Multi-level facility location problems. *European Journal of Operational Research*, 267(3), 791–805. <https://doi.org/10.1016/j.ejor.2017.10.019>
- [161] Pariazar, M., & Sir, M. Y. (2018). A multi-objective approach for supply chain design considering disruptions impacting supply availability and quality. *Computers & Industrial Engineering*, 121, 113–130. <https://doi.org/10.1016/j.cie.2018.05.026>
- [162] Parodos, L., Tsolakis, O., Tsoukos, G., Xenou, E., & Ayfantopoulou, G. (2022). Business model analysis of smart city logistics solutions using the business model canvas: The case of an on-demand warehousing e-marketplace. *Future Transportation*, 2(2), 467–481. <https://doi.org/10.3390/futuretransp2020026>
- [163] Peng, D., Ye, C., & Wan, M. (2022). A multi-objective improved novel discrete particle swarm optimization for emergency resource center location problem. *Engineering Applications of Artificial Intelligence*, 111, 104725. <https://doi.org/10.1016/j.engappai.2022.104725>
- [164] Pishvae, M. S., Razmi, J., & Torabi, S. A. (2012). Robust possibilistic programming for socially responsible supply chain network design: A new approach. *Fuzzy Sets and Systems*, 206, 1–20. <https://doi.org/10.1016/j.fss.2012.04.010>
- [165] Pishvae, M. S., Razmi, J., & Torabi, S. A. (2014). An accelerated Benders decomposition algorithm for sustainable supply chain network design under uncertainty: A case study of medical needle and syringe supply chain. *Transportation Research Part E: Logistics and Transportation Review*, 67, 14–38. <https://doi.org/10.1016/j.tre.2014.04.001>
- [166] Pourjavad, E., & Mayorga, R. V. (2019). Multi-objective fuzzy programming of closed-loop supply chain considering sustainable measures. *International Journal of Fuzzy Systems*, 21(2), 655–673. <https://doi.org/10.1007/s40815-018-0551-y>

- [167] Prakash, S., Kumar, S., Soni, G., Jain, V., & Rathore, A. P. S. (2020). Closed-loop supply chain network design and modelling under risks and demand uncertainty: An integrated robust optimization approach. *Annals of Operations Research*, 290(1), 837–864. <https://doi.org/10.1007/s10479-018-2902-3>
- [168] Puerto, J., Ricca, F., & Scozzari, A. (2014). Reliability problems in multiple path-shaped facility location on networks. *Discrete Optimization*, 12, 61–72. <https://doi.org/10.1016/j.disopt.2014.01.003>
- [169] Rahimi, M., Ghezavati, V., & Asadi, F. (2019). A stochastic risk-averse sustainable supply chain network design problem with quantity discount considering multiple sources of uncertainty. *Computers & Industrial Engineering*, 130, 430–449. <https://doi.org/10.1016/j.cie.2019.02.037>
- [170] Rajeev, A., Pati, R., Padhi, S., & Govindan, K. (2017). Evolution of sustainability in supply chain management: A literature review. *Journal of Cleaner Production*, 162, 299–314. <https://doi.org/10.1016/j.jclepro.2017.05.026>
- [171] Rajesh, R. (2020). Network design for resilience in supply chains using novel crazy elitist TLBO. *Neural Computing and Applications*, 32(11), 7421–7437. <https://doi.org/10.1007/s00521-019-04260-3>
- [172] Ramezani, R., & Behboodi, Z. (2017). Blood supply chain network design under uncertainties in supply and demand considering social aspects. *Transportation Research Part E: Logistics and Transportation Review*, 104, 69–82. <https://doi.org/10.1016/j.tre.2017.06.004>
- [173] Reddy, K. N., Kumar, A., Choudhary, A., & Cheng, T. E. (2022). Multi-period green reverse logistics network design: An improved Benders-decomposition-based heuristic approach. *European Journal of Operational Research*, 3(2), 735–752. <https://doi.org/10.1016/j.ejor.2022.03.014>
- [174] Rezapour, S., Farahani, R. Z., & Pourakbar, M. (2017). Resilient supply chain network design under competition: A case study. *European Journal of Operational Research*, 259(3), 1017–1035. <https://doi.org/10.1016/j.ejor.2016.11.041>
- [175] Rizk-Allah, R. M., Abo-Sinna, M. A., & Hassanien, A. E. (2021). Intuitionistic fuzzy sets and dynamic programming for multi-objective non-linear programming problems. *International Journal of Fuzzy Systems*, 23(2), 334–352. <https://doi.org/10.1007/s40815-020-00973-z>
- [176] Rohmer, S., Gerdessen, J. C., & Claassen, G. (2019). Sustainable supply chain design in the food system with dietary considerations: A multi-objective analysis. *European Journal of Operational Research*, 273(3), 1149–1164. <https://doi.org/10.1016/j.ejor.2018.09.006>
- [177] Rozhkov, M., Ivanov, D., Blackhurst, J., & Nair, A. (2022). Adapting supply chain operations in anticipation of and during the COVID-19 pandemic. *Omega*, 110, 102635. <https://doi.org/10.1016/j.omega.2022.102635>
- [178] Ryu, J., & Park, S. (2022). A branch-and-price algorithm for the robust single-source capacitated facility location problem under demand uncertainty. *EURO Journal on Transportation and Logistics*, 11, 100069. <https://doi.org/10.1016/j.ejtl.2021.100069>
- [179] Sabouhi, F., Pishvaei, M. S., & Jabalameli, M. S. (2018). Resilient supply chain design under operational and disruption risks considering quantity discount: A case study of pharmaceutical supply chain. *Computers & Industrial Engineering*, 126, 657–672. <https://doi.org/10.1016/j.cie.2018.10.001>
- [180] Sadghiani, N. S., Torabi, S., & Sahebjamnia, N. (2015). Retail supply chain network design under operational and disruption risks. *Transportation Research Part E: Logistics and Transportation Review*, 75, 95–114. <https://doi.org/10.1016/j.tre.2014.12.015>
- [181] Sahebjamnia, N., Fathollahi-Fard, A. M., & Hajiaghahi-Keshteli, M. (2018). Sustainable tire closed-loop supply chain network design: Hybrid metaheuristic algorithms for large-scale networks. *Journal of Cleaner Production*, 196, 273–296. <https://doi.org/10.1016/j.jclepro.2018.05.245>
- [182] Samani, M. R. G., & Hosseini-Motlagh, S.-M. (2019). An enhanced procedure for managing blood supply chain under disruptions and uncertainties. *Annals of Operations Research*, 283(1), 1413–1462. <https://doi.org/10.1007/s10479-018-2873-4>

- [183] Santibañez-Aguilar, J. E., González-Campos, J. B., Ponce-Ortega, J. M., Serna-González, M., & El-Halwagi, M. M. (2014). Optimal planning and site selection for distributed multiproduct biorefineries involving economic, environmental and social objectives. *Journal of Cleaner Production*, *65*, 270–294. <https://doi.org/10.1016/j.jclepro.2013.08.004>
- [184] Sauvey, C., Melo, T., & Correia, I. (2020). Heuristics for a multi-period facility location problem with delayed demand satisfaction. *Computers & Industrial Engineering*, *139*, 106171. <https://doi.org/10.1016/j.cie.2019.106171>
- [185] Sawik, T. (2022). Stochastic optimization of supply chain resilience under ripple effect: A COVID-19 pandemic related study. *Omega*, *109*, 102596. <https://doi.org/10.1016/j.omega.2022.102596>
- [186] Sazvar, Z., Tafakkori, K., Oladzad, N., & Nayeri, S. (2021). A capacity planning approach for sustainable-resilient supply chain network design under uncertainty: A case study of vaccine supply chain. *Computers & Industrial Engineering*, *159*, 107406. <https://doi.org/10.1016/j.cie.2021.107406>
- [187] Schatteman, O., Woodhouse, D., & Terino, J. (2020). Supply chain lessons from Covid-19: Time to refocus on resilience. *Bain & Company, Inc., Boston, MA*, 1–12.
- [188] Scholten, K., Stevenson, M., & van Donk, D. P. (2020). Dealing with the unpredictable: Supply chain resilience. *International Journal of Operations & Production Management*, *40*, 1–10. <https://doi.org/10.1108/IJOPM-01-2020-789>
- [189] Shang, X., Zhang, G., Jia, B., & Almanaseer, M. (2022). The healthcare supply location-inventory-routing problem: A robust approach. *Transportation Research Part E: Logistics and Transportation Review*, *158*, 102588. <https://doi.org/10.1016/j.tre.2021.102588>
- [190] Shekarian, M., & Mellat Parast, M. (2021). An integrative approach to supply chain disruption risk and resilience management: A literature review. *International Journal of Logistics Research and Applications*, *24*(5), 427–455. <https://doi.org/10.1080/13675567.2020.1763935>
- [191] Sherafati, M., Bashiri, M., Tavakkoli-Moghaddam, R., & Pishvaei, M. S. (2019). Supply chain network design considering sustainable development paradigm: A case study in cable industry. *Journal of Cleaner Production*, *234*, 366–380. <https://doi.org/10.1016/j.jclepro.2019.06.095>
- [192] Soleimani, H., Govindan, K., Saghafi, H., & Jafari, H. (2017). Fuzzy multi-objective sustainable and green closed-loop supply chain network design. *Computers & Industrial Engineering*, *109*, 191–203. <https://doi.org/10.1016/j.cie.2017.04.038>
- [193] Suryawanshi, P., & Dutta, P. (2022). Optimization models for supply chains under risk, uncertainty, and resilience: A state-of-the-art review and future research directions. *Transportation Research Part E: Logistics and Transportation Review*, *157*, 102553. <https://doi.org/10.1016/j.tre.2021.102553>
- [194] Talaei, M., Moghaddam, B. F., Pishvaei, M. S., Bozorgi-Amiri, A., & Gholamnejad, S. (2016). A robust fuzzy optimization model for carbon-efficient closed-loop supply chain network design problem: A numerical illustration in electronics industry. *Journal of Cleaner Production*, *113*, 662–673. <https://doi.org/10.1016/j.jclepro.2015.10.074>
- [195] Taleizadeh, A. A., Ahmadzadeh, K., Sarker, B. R., & Ghavamifar, A. (2022). Designing an optimal sustainable supply chain system considering pricing decisions and resilience factors. *Journal of Cleaner Production*, *332*, 129895. <https://doi.org/10.1016/j.jclepro.2021.129895>
- [196] Tang, C. S. (2006). Perspectives in supply chain risk management. *International Journal of Production Economics*, *103*(2), 451–488. <https://doi.org/10.1016/j.ijpe.2005.12.006>
- [197] Tang, C. S., & Veelenturf, L. P. (2019). The strategic role of logistics in the industry 4.0 era. *Transportation Research Part E: Logistics and Transportation Review*, *129*, 1–11. <https://doi.org/10.1016/j.tre.2019.06.004>
- [198] Tarei, P. K., Kumar, G., & Ramkumar, M. (2022). A mean-variance robust model to minimize operational risk and supply chain cost under aleatory uncertainty: A real-life case application in petroleum supply chain. *Computers & Industrial Engineering*, *166*, 107949. <https://doi.org/10.1016/j.cie.2022.107949>

- [199] Tavana, M., Kian, H., Nasr, A. K., Govindan, K., & Mina, H. (2022). A comprehensive framework for sustainable closed-loop supply chain network design. *Journal of Cleaner Production*, 332, 129777. <https://doi.org/10.1016/j.jclepro.2021.129777>
- [200] Ting, C.-J., & Chen, C.-H. (2013). A multiple ant colony optimization algorithm for the capacitated location routing problem. *International Journal of Production Economics*, 141(1), 34–44. <https://doi.org/10.1016/j.ijpe.2012.06.011>
- [201] Tirkolaee, E., Goli, A., Ghasemi, P., & Goodarzian, F. (2022). Designing a sustainable closed-loop supply chain network of face masks during the COVID-19 pandemic: Pareto-based algorithms. *Journal of Cleaner Production*, 333, 130056. <https://doi.org/10.1016/j.jclepro.2021.130056>
- [202] Tirkolaee, E. B., & Aydin, N. S. (2022). Integrated design of sustainable supply chain and transportation network using a fuzzy bi-level decision support system for perishable products. *Expert Systems with Applications*, 195, 116628. <https://doi.org/10.1016/j.eswa.2022.116628>
- [203] Torabi, S., Namdar, J., Hatefi, S., & Jolai, F. (2016). An enhanced possibilistic programming approach for reliable closed-loop supply chain network design. *International Journal of Production Research*, 54(5), 1358–1387. <https://doi.org/10.1080/00207543.2015.1070215>
- [204] Tordecilla, R. D., Montoya-Torres, J. R., Quintero-Araujo, C. L., Panadero, J., & Juan, A. A. (2022). The location routing problem with facility sizing decisions. *International Transactions in Operational Research*. <https://doi.org/10.1111/itor.13125>
- [205] Tosarkani, B. M., & Amin, S. H. (2018). A possibilistic solution to configure a battery closed-loop supply chain: Multi-objective approach. *Expert Systems with Applications*, 92, 12–26. <https://doi.org/10.1016/j.eswa.2017.09.039>
- [206] Tsao, Y.-C., Thanh, V.-V., Lu, J.-C., & Yu, V. (2018). Designing sustainable supply chain networks under uncertain environments: Fuzzy multi-objective programming. *Journal of Cleaner Production*, 174, 1550–1565. <https://doi.org/10.1016/j.jclepro.2017.10.272>
- [207] Tucker, E. L., Daskin, M. S., Sweet, B. V., & Hopp, W. J. (2020). Incentivizing resilient supply chain design to prevent drug shortages: Policy analysis using two- and multi-stage stochastic programs. *IIE Transactions*, 52(4), 394–412. <https://doi.org/10.1080/24725854.2019.1646441>
- [208] Turkeš, R., Sörensen, K., & Cuervo, D. P. (2021). A matheuristic for the stochastic facility location problem. *Journal of Heuristics*, 27(4), 649–694. <https://doi.org/10.1007/s10732-021-09468-y>
- [209] Van Engeland, J., Beliën, J., De Boeck, L., & De Jaeger, S. (2020). Literature review: Strategic network optimization models in waste reverse supply chains. *Omega*, 91, 102012. <https://doi.org/10.1016/j.omega.2018.12.001>
- [210] Varsei, M., & Polyakovskiy, S. (2017). Sustainable supply chain network design: A case of the wine industry in Australia. *Omega*, 66, 236–247. <https://doi.org/10.1016/j.omega.2015.11.009>
- [211] Verhoef, P. C. (2021). Omni-channel retailing: Some reflections. *Journal of Strategic Marketing*, 29(7), 608–616. <https://doi.org/10.1080/0965254X.2021.1892163>
- [212] Wang, Q., & Nie, X. (2022). A stochastic programming model for emergency supply planning considering transportation network mitigation and traffic congestion. *Socio-Economic Planning Sciences*, 79, 101119. <https://doi.org/10.1016/j.seps.2021.101119>
- [213] Wang, Y., Hong, A., Li, X., & Gao, J. (2020). Marketing innovations during a global crisis: A study of China firms' response to COVID-19. *Journal of Business Research*, 116, 214–220. <https://doi.org/10.1016/j.jbusres.2020.05.029>
- [214] Weber, A. (1962). *Theory of the location of industries*. University of Chicago Press.
- [215] West, V. (2022). Truckers' strike in Spain disrupts food industry. *Reuters*. Retrieved 17 March, 2022, from <https://www.reuters.com/business/energy/truckers-strike-spain-disrupts-food-industry-2022-03-17/>.

- [216] Wieland, A. (2021). Dancing the supply chain: Toward transformative supply chain management. *Journal of Supply Chain Management*, 57(1), 58–73. <https://doi.org/10.1111/jscm.12248>
- [217] Wu, G.-H., Chang, C.-K., & Hsu, L.-M. (2018). Comparisons of interactive fuzzy programming approaches for closed-loop supply chain network design under uncertainty. *Computers & Industrial Engineering*, 125, 500–513. <https://doi.org/10.1016/j.cie.2018.09.022>
- [218] Wu, Y., Qureshi, A. G., & Yamada, T. (2022). Adaptive large neighborhood decomposition search algorithm for multi-allocation hub location routing problem. *European Journal of Operational Research*, 302(3), 1113–1127. <https://doi.org/10.1016/j.ejor.2022.02.002>
- [219] Xie, W., Jiang, Z., Zhao, Y., & Hong, J. (2014). Capacity planning and allocation with multi-channel distribution. *International Journal of Production Economics*, 147, 108–116. <https://doi.org/10.1016/j.ijpe.2013.08.005>
- [220] Xu, H., Gong, Y. Y., Chu, C., & Zhang, J. (2017). Dynamic lot-sizing models for retailers with online channels. *International Journal of Production Economics*, 183, 171–184. <https://doi.org/10.1016/j.ijpe.2016.10.020>
- [221] Yadav, V. S., Tripathi, S., & Singh, A. (2018). Bi-objective optimization for sustainable supply chain network design in omnichannel. *Journal of Manufacturing Technology Management*, 30(6), 972–986. <https://doi.org/10.1108/JMTM-06-2017-0118>
- [222] Yao, Z., Gendreau, M., Li, M., Ran, L., & Wang, Z. (2022). Service operations of electric vehicle carsharing systems from the perspectives of supply and demand: A literature review. *Transportation Research Part C: Emerging Technologies*, 140, 103702. <https://doi.org/10.1016/j.trc.2022.103702>
- [223] Yavari, M., & Zaker, H. (2019). An integrated two-layer network model for designing a resilient green-closed loop supply chain of perishable products under disruption. *Journal of Cleaner Production*, 230, 198–218. <https://doi.org/10.1016/j.jclepro.2019.04.130>
- [224] Yavari, M., & Zaker, H. (2020). Designing a resilient-green closed loop supply chain network for perishable products by considering disruption in both supply chain and power networks. *Computers & Chemical Engineering*, 134, 106680. <https://doi.org/10.1016/j.compchemeng.2019.106680>
- [225] Yildiz, H., Yoon, J., Talluri, S., & Ho, W. (2016). Reliable supply chain network design. *Decision Sciences*, 47(4), 661–698. <https://doi.org/10.1111/deci.12160>
- [226] Yılmaz, Ö. F., Özçelik, G., & Yeni, F. B. (2021). Ensuring sustainability in the reverse supply chain in case of the ripple effect: A two-stage stochastic optimization model. *Journal of Cleaner Production*, 282, 124548. <https://doi.org/10.1016/j.jclepro.2020.124548>
- [227] You, F., Tao, L., Graziano, D. J., & Snyder, S. W. (2012). Optimal design of sustainable cellulosic biofuel supply chains: Multiobjective optimization coupled with life cycle assessment and input–output analysis. *AIChE Journal*, 58(4), 1157–1180. <https://doi.org/10.1002/aic.12637>
- [228] Yu, H., & Solvang, W. D. (2020). A fuzzy-stochastic multi-objective model for sustainable planning of a closed-loop supply chain considering mixed uncertainty and network flexibility. *Journal of Cleaner Production*, 266, 121702. <https://doi.org/10.1016/j.jclepro.2020.121702>
- [229] Yue, D., Slivinsky, M., Sumpter, J., & You, F. (2014). Sustainable design and operation of cellulosic bioelectricity supply chain networks with life cycle economic, environmental, and social optimization. *Industrial & Engineering Chemistry Research*, 53(10), 4008–4029. <https://doi.org/10.1021/ie403882v>
- [230] Zahiri, B., Zhuang, J., & Mohammadi, M. (2017). Toward an integrated sustainable-resilient supply chain: A pharmaceutical case study. *Transportation Research Part E: Logistics and Transportation Review*, 103, 109–142. <https://doi.org/10.1016/j.tre.2017.04.009>
- [231] Zandkarimkhani, S., Mina, H., Biuki, M., & Govindan, K. (2020). A chance constrained fuzzy goal programming approach for perishable pharmaceutical supply chain network design. *Annals of Operations Research*, 295(1), 425–452. <https://doi.org/10.1007/s10479-020-03677-7>

- [232] Zhalechian, M., Tavakkoli-Moghaddam, R., Zahiri, B., & Mohammadi, M. (2016). Sustainable design of a closed-loop location-routing-inventory supply chain network under mixed uncertainty. *Transportation Research Part E: Logistics and Transportation Review*, 89, 182–214. <https://doi.org/10.1016/j.tre.2016.02.011>
- [233] Zhang, S., Lee, C. K. M., Wu, K., & Choy, K. L. (2016). Multi-objective optimization for sustainable supply chain network design considering multiple distribution channels. *Expert Systems with Applications*, 65, 87–99. <https://doi.org/10.1016/j.eswa.2016.08.037>
- [234] Zhang, Y., & Jiang, Y. (2017). Robust optimization on sustainable biodiesel supply chain produced from waste cooking oil under price uncertainty. *Waste Management*, 60, 329–339. <https://doi.org/10.1016/j.wasman.2016.11.004>

Die PDF-Dateien der folgenden Berichte sind verfügbar unter:

The PDF files of the following reports are available under:

<http://www.htwsaar.de/wiwi>

1 I. Correia, T. Melo, F. Saldanha da Gama

Comparing classical performance measures for a multi-period, two-echelon supply chain network design problem with sizing decisions

Keywords: supply chain network design, facility location, capacity acquisition, profit maximization, cost minimization

(43 pages, 2012)

2 T. Melo

A note on challenges and opportunities for Operations Research in hospital logistics

Keywords: hospital logistics, Operations Research, application areas

(13 pages, 2012)

3 S. Hütter, A. Steinhaus

Forschung an Fachhochschulen – Treiber für Innovation im Mittelstand: Ergebnisse der Qbing-Trendumfrage 2013

Keywords: Innovation, Umfrage, Trendbarometer, Logistik-Konzepte, Logistik-Technologien, Mittelstand, KMU

(5 pages, 2012)

4 A. Steinhaus, S. Hütter

Leitfaden zur Implementierung von RFID in kleinen und mittelständischen Unternehmen

Keywords: RFID, KMU, schlanke Prozesse, Prozessoptimierung, Produktion, Forschungsgruppe Qbing

(49 pages, 2013)

5 S.A. Alumur, B.Y. Kara, M.T. Melo

Location and Logistics

Keywords: forward logistics network design, reverse logistics network design, models, applications

(26 pages, 2013)

6 S. Hütter, A. Steinhaus

Forschung an Fachhochschulen – Treiber für Innovation im Mittelstand: Ergebnisse der Qbing-Trendumfrage 2014

Keywords: Innovation, Umfrage, Trendbarometer, Logistik-Konzepte, Logistik-Technologien, Mittelstand, KMU

(6 pages, 2014)

7 M.J. Cortinhal, M.J. Lopes, M.T. Melo

Redesigning a three-echelon logistics network over multiple time periods with transportation mode selection and outsourcing opportunities

Keywords: logistics network design/re-design, multiple periods, transportation mode selection, product outsourcing, mixed-integer linear programming

(49 pages, 2014)

8 T. Bousonville, C. Ebert, J. Rath

A comparison of reward systems for truck drivers based on telematics data and driving behavior assessments

Keywords: telematics, driving behavior, incentives, award systems

(9 pages, 2015)

9 I. Correia, T. Melo

Multi-period capacitated facility location under delayed demand satisfaction

Keywords: location, multi-period, capacity choice, delivery lateness, MILP models

(35 pages, 2015)

10 C.L. Martins, M.T. Melo, M.V. Pato

Redesigning a food bank supply chain network, Part I: Background and mathematical formulation

Keywords: supply chain, sustainability, tri-objective problem, MILP model

(30 pages, 2016)

11 I. Correia, T. Melo

A computational comparison of formulations for a multi-period facility location problem with modular capacity adjustments and flexible demand fulfillment

Keywords: facility location, multi-period, capacity expansion and contraction, delivery lateness, mixed-integer linear models

(42 pages, 2016)

12 A. Bernhardt, T. Melo, T. Bousonville, H. Kopfer

Scheduling of driver activities with multiple soft time windows considering European regulations on rest periods and breaks

Keywords: road transportation, driver scheduling, rest periods, breaks, driving hours, Regulation (EC) No 561/2006, mixed integer linear programming models

(137 pages, 2016)

13 C.L. Martins, M.T. Melo,
M.V. Pato

Redesigning a food bank supply chain network, Part II: Computational study

Keywords: food rescue and delivery, sustainability, supply chain network design, tri-objective problem, social impact, economic and environmental performance

(57 pages, 2017)

14 A. Bernhardt, T. Melo,
T. Bousonville, H. Kopfer

Truck driver scheduling with combined planning of rest periods, breaks and vehicle refueling

Keywords: road transportation, refueling, fuel cost, driver scheduling, rest periods, breaks, driving hours, Regulation (EC) No 561/2006, mixed integer linear programming

(90 pages, 2017)

15 M.J. Cortinhal, M.J. Lopes,
M.T. Melo

Impact of partial product outsourcing, transportation mode selection, and single-assignment requirements on the design of a multi-stage supply chain network

Keywords: supply chain network design, facility location, supplier selection, in-house production, product outsourcing, transportation mode selection, single-assignment, mixed-integer linear programming

(51 pages, 2018)

16 C. Sauvey, T. Melo, I. Correia

Two-phase heuristics for a multi-period capacitated facility location problem with service-differentiated customers

Keywords: facility location, multi-period, delivery lateness, constructive heuristics, local improvements

(41 pages, 2019)

17 I. Correia, T. Melo

Dynamic facility location problem with modular capacity adjustments under uncertainty

Keywords: facility location, dynamic capacity adjustment, delivery lateness, stochastic programming, valid inequalities

(42 pages, 2019)

18 A. Aliano Filho, T. Melo, M. Vaz Pato

Tactical planning of sugarcane harvest and transport operations

Keywords: multi-objective optimization, mixed-integer programming, sugarcane harvest and transport planning

(50 pages, 2020)

19 I. Correia, T. Melo

The impact of flexible warehouse lease contracts on the configuration of a two-echelon distribution network

Keywords: distribution network redesign, short-term storage space rental, mixed-integer linear programming, valid inequalities

(49 pages, 2021)

20 Y. Costa, T. Melo

Supplementary material to the book chapter “*Facility Location Modeling in Supply Chain Network Design: Current State and Emerging Trends*”

Keywords: Facility location, Sustainable network design, Circular economy, Data scarcity, Resilience, Omnichannel

(23 pages, 2022)

Hochschule für Technik und Wirtschaft des Saarlandes

Die Hochschule für Technik und Wirtschaft des Saarlandes (htw saar) wurde im Jahre 1971 als saarländische Fachhochschule gegründet. Insgesamt studieren rund 6000 Studentinnen und Studenten in 46 verschiedenen Studiengängen an der htw saar, aufgeteilt auf vier Fakultäten.

In den vergangenen zwanzig Jahren hat die Logistik immens an Bedeutung gewonnen. Die htw saar hat dieser Entwicklung frühzeitig Rechnung getragen und einschlägige Studienprogramme sowie signifikante Forschungs- und Technologietransferaktivitäten entwickelt. Die Veröffentlichung der Schriftenreihe Logistik soll die Ergebnisse aus Forschung und Projektpraxis der Öffentlichkeit zugänglich machen.

Weitere Informationen finden Sie unter <http://logistik.htwsaar.de>



Institut für Supply Chain und Operations Management

Das Institut für Supply Chain und Operations Management (ISCOM) der htw saar ist auf die Anwendung quantitativer Methoden in der Logistik und deren Implementierung in IT-Systemen spezialisiert. Neben öffentlich geförderten Forschungsprojekten zu innovativen Themen arbeitet ISCOM eng mit Projektpartnern aus der Wirtschaft zusammen, wodurch der Wissens- und Technologietransfer in die Praxis gewährleistet wird. Zu den Arbeitsgebieten zählen unter anderem Distributions- und Transportplanung, Supply Chain Design, Bestandsmanagement in Supply Chains, Materialflussanalyse und -gestaltung sowie Revenue Management.

Weitere Informationen finden Sie unter <http://iscom.htwsaar.de>



Forschungsgruppe Qbing

Qbing ist eine Forschungsgruppe an der Hochschule für Technik und Wirtschaft des Saarlandes, die spezialisiert ist auf interdisziplinäre Projekte in den Bereichen Produktion, Logistik und Technologie. Ein Team aus derzeit acht Ingenieuren und Logistikexperten arbeitet unter der wissenschaftlichen Leitung von Prof. Dr. Steffen Hütter sowohl in öffentlich geförderten Projekten als auch zusammen mit Industriepartnern an aktuellen Fragestellungen zur Optimierung von logistischen Prozessabläufen in Handel und Industrie unter Einbeziehung modernster Sensortechnologie und Telemetrie. Qbing hat auch und gerade auf dem Gebiet der angewandten Forschung Erfahrung in der Zusammenarbeit mit kleinen und mittelständischen Unternehmen.

Weitere Informationen finden Sie unter <http://www.qbing.de>

ISSN 2193-7761