



A novel mathematical model to design an agile supply chain for perishable products

O. Anichkina^a, T.-C. Chen^{b*}, S. I. Sivakov^c, O. Y. Voronkova^d, S. A. Gorovoy^e, A. A. Davidyants^f

^a K.G. Razumovsky Moscow State University of Technologies and Management, Moscow, Russian Federation;

^b Department of Industrial Engineering and Management, Ming Chi University of Technology, New Taipei City 24301, Taiwan

^c Belgorod State University, Belgorod, Russian Federation;

^d Altai State University, Barnaul, Russian Federation;

^e Kuban State Agrarian University named after I.T. Trubilin, Department of Machine Repair and Materials Science, Krasnodar, Russian Federation;

^f Sechenov First Moscow State Medical University, Department of Propaedeutics of Dental Diseases, Moscow, Russian Federation

References

- [1] Roh, J.; Hong, P.; Min, H. Implementation of a responsive supply chain strategy in global complexity: The case of manufacturing firms. *International Journal of Production Economics*, 2014, 147, 198–210. DOI: 10.1016/j.ijpe.2013.04.013
- [2] Goli A, Zare HK, Tavakkoli-Moghaddam R, Sadegheih A. Multiobjective fuzzy mathematical model for a financially constrained closed-loop supply chain with labor employment. *Computational Intelligence*. 2020;36(1),4-34. DOI: 10.1111/coin.12228
- [3] Marchi, B.; Zanoni, S.; Jaber, M.Y., Economic production quantity model with learning in production, quality, reliability and energy efficiency. *Computers & Industrial Engineering*, 2019, 129, 502-511. DOI: 10.1016/j.cie.2019.02.009
- [4] Mukherjee, A.; Dey, O.; Giri, B.C., An integrated vendor-buyer model with stochastic demand, lot-size dependent lead-time and learning in production. *Journal of Industrial Engineering International*, 2019, 1-14. DOI: 10.1007/s40092-019-00326-y
- [5] Willis, G.; Genchev, S.E.; Chen, H., Supply chain learning, integration, and flexibility performance: an empirical study in India. *The International Journal of Logistics Management*, 2016, 27(3), pp.755-769. DOI: 10.1108/IJLM-03-2014-0042
- [6] Mahmoodi, M. A new multi-objective model of agile supply chain network design considering transportation limits. *Production & Manufacturing Research*, 2019, 7(1), pp. 1-22. DOI: 10.1080/21693277.2019.1571956
- [7] Khorasani, S.T. A robust optimization model for supply chain in agile and flexible mode based on variables of uncertainty. *Global Journal of Flexible Systems Management*, 2018, 19(3), 239-253. DOI: 10.1007/s40171-018-0191-y
- [8] Ritchie, B.; Brindley, C. Risk characteristics of the supply chain-A contingency framework. *Supply chain risk*, 2004, 28-42. eBook: ISBN9781315242057
- [9] Moradi, A.; Razmi, J.; Babazadeh, R.; Sabbaghnia, A. An integrated Principal Component Analysis and multi-objective mathematical programming approach to agile supply chain network design under uncertainty. *Journal of Industrial & Management Optimization*, 2019, 15(2), 855. DOI: 10.3934/jimo.2018074
- [10] Piya, S.; Shamsuzzoha, A.; Khadem, M.; Al-Hinai, N. Identification of critical factors and their interrelationships to design agile supply chain: special focus to oil and gas industries. *Global Journal of Flexible Systems Management*, 2020, 21(3), 263-281. DOI: 10.1007/s40171-020-00247-5
- [11] Kalaboukas, K.; Rožanec, J.; Košmerlj, A.; Kirtsis, D.; Arampatzis, G. Implementation of Cognitive Digital Twins in Connected and Agile Supply Networks—An Operational Model. *Applied Sciences*, 2021, 11(9), 4103. DOI: 10.3390/app11094103
- [12] Ahmed, W.; Huma, S. Impact of lean and agile strategies on supply chain risk management. *Total Quality Management & Business Excellence*, 2021, 32(1-2), 33-56. DOI: 10.1080/14783363.2018.1529558
- [13] Julia Acevedo-Urquiaga A., Sablón-Cossío N., Antonio Acevedo-Suárez J., and Julia Urquiaga-Rodríguez A., “A model with a collaborative approach for the operational management of the supply chain,” *Int J Ind Eng Manag*, vol. Volume 12, no. Issue 1, pp. 49–62, Mar. 2021, DOI: 10.24867/IJIEM-2021-1-276.
- [14] Rakic S., Pavlovic M., and Marjanovic U., “A Precondition of Sustainability: Industry 4.0 Readiness,” *Sustainability*, vol. 13, no. 12, p. 6641, Jun. 2021, DOI: 10.3390/su13126641.

- [15] Kunnapapdeelert S. and Pitchayadejanant K., "Analyzing the effect of supply chain strategies and collaboration on performance improvement using MIMIC model," *Int J Ind Eng Manag*, vol. 12, no. 3, pp. 216–225, Sep. 2021, DOI: 10.24867/IJIEM-2021-3-289.
- [16] Pattanaik L. N., "Simulation Optimization of Manufacturing Takt Time for a Leagile Supply Chain with a De-coupling Point," *Int J Ind Eng Manag*, vol. 12, no. 2, pp. 102–114, Jun. 2021, DOI: 10.24867/IJIEM-2021-2-280.
- [17] Zivlak N., Rakic S., Marjanovic U., Ciric D., and Bogojevic B., "The Role of Digital Servitization in Transition Economy: An SNA Approach," *Teh. vjesn.*, vol. 28, no. 6, Dec. 2021, DOI: 10.17559/TV-20210325083229.
- [18] Torabi, S. Ali; Elkafi Hassini. An interactive possibilistic programming approach for multiple objective supply chain master planning. *"Fuzzy sets and systems*, 2008, 159(2),193-214. DOI: 10.1016/j.fss.2007.08.010
- [19] Rudnichenko, Y., Liubokhynets, L., Havlovská, N., Illiashenko, O. and Avanesova, N. "Qualitative justification of strategic management decisions in choosing agile management methodologies," *Int. J. Qual. Res.*, vol. 15, no. 1, pp. 209–224, 2021, DOI: 10.24874/IJQR15.01-12.
- [20] Goli A, Davoodi SM. Coordination policy for production and delivery scheduling in the closed loop supply chain. *Production Engineering*. 2018, 12(5),621-31. DOI: 10.1007/s11740-018-0841-0
- [21] Pahlevan SM, Hosseini SM, Goli A. Sustainable supply chain network design using products' life cycle in the aluminum industry. *Environmental Science and Pollution Research*. 2021,21:1-25. DOI: 10.1007/s11356-020-12150-8