

Chapter 2

COMPREHENSIVE LITERATURE REVIEW FOR CLOSED LOOP SUPPLY CHAIN STUDIES

Emel YONTAR¹
Onur DERSE²

INTRODUCTION

Over the years, supply chain management has been concerned with forward-looking activities. However, the increasing environmental problems, the awareness of customers about recycling, legal regulations have started to put the companies under pressure and placed a social responsibility besides the environment on them. These developments led to the emergence of concepts such as reverse logistics, reverse supply chain management and product recovery options. That is why, in recent years, companies have thought about creating a cost and competitive advantage compared to other companies by focusing on reverse logistics (Wang & Hsu, 2010a). Since the existing advanced supply chain structures are insufficient to realize this idea, it has become inevitable to expand these structures to include product recycling.

The reverse supply chain is not the symmetry of the advanced (classical) supply chain. The reverse supply chain involves more complex, expensive and different processes than the advanced supply chain and also requires more reactivity (Srivastava, 2008). Closed Loop Supply Chain (CLSC) is produced at the production facilities of the raw materials suppliers and delivered to the customers through various distribution channels and the collection channels of the products used by the customers and recycling, disassembly, collection center, etc. It can be considered as a whole of forward and reverse logistics activities that enable it to be included in the production process with its recycling facilities. The closed-loop supply chain provides an environmentally friendly value to our world, which is rapidly polluted by the reverse logistics activities that allow to reintroduce the used products to the network as well as the benefits provided by the classical supply chain (Budak, 2012). The visual of the CLSC is given in Figure 1.

¹ Öğretim Görevlisi-Tarsus Üniversitesi e-mail: eyontar@tarsus.edu.tr

² Öğretim Görevlisi-Tarsus Üniversitesi e-mail: onurderse@tarsus.edu.tr

Life Cycle, Product Improvement Management, Disassembly Line Balancing.

Solution methods for these issues are less frequently used than are used respectively; Mixed Integer Linear Programming, Other Mathematical Model, Fuzzy Modeling, Genetic Algorithm, Survey, Stochastic Programming Model Mixed Integer Nonlinear Mathematical Programming, Multipurpose Integer Linear Programming, Game Theory, Optimization Model, Analytical Approach, Linear Programming, 0-1 Integer Programming, Simulation, Stochastic Integer Programming, Particle Swarm Optimization, Tabu Search Method, System Dynamics Model, Simulated Annealing, Branch and Bound Algorithm, Benders Decomposition Method, Stochastic Dynamic Programming, Fuzzy Goal Programming, Robust Optimization Model, Multipurpose Inventory Model, Fuzzy Analytic Hierarchy Process Model (AHP), Stochastic Probabilistic Programming, Mixed Integer Optimization Model, Mixed Integer Mathematical Model, Parallel Numbering Method, Lagrangian Relaxation Method, Fuzzy Mixed Integer Linear Programming, Conceptual Framework.

In this context, it is aimed that those who are interested in the subject will be able to guide their work by looking at the general framework and contribute to the literature in different areas.

REFERENCES

- Agrawal, S., Singh, R. K., & Murtaza, Q. (2015). A literature review and perspectives in reverse logistics. *Resources, Conservation and Recycling*, 97, 76-92.
- Ahmadi, S., & Amin, S. H. (2019). An integrated chance-constrained stochastic model for a mobile phone closed-loop supply chain network with supplier selection. *Journal of cleaner production*, 226, 988-1003.
- Akçali, E. And Çetinkaya, S., Quantitative Models For Inventory And Production Planning in Closed-Loop Supply Chains, *International Journal Of Production Research*, 49 (8), 2373-2407, 2011.
- Aldemir G., A Closed Loop Sustainable Supply Chain Network Design For Waste Electrical & Electronic Equipment, *Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi, İstanbul*, 2016.
- Almaraj, I. I., & Trafalis, T. B. (2019). An integrated multi-echelon robust closed-loop supply chain under imperfect quality production. *International Journal of Production Economics*, 218, 212-227.
- Amaro, A. C. S., & Barbosa-Povoa, A. P. F. D.. The Effect Of Uncertainty On The Optimal Closed-Loop Supply Chain Planning Under Different Partnerships Structure. *Computers & Chemical Engineering*, 33(12), 2144-2158, 2009.
- Amin ve Baki, A Facility Location Model For Global Closed-Loop Supply Chain Network Design, *Applied Mathematical Modelling* 41, 316-330, 2017.
- Amin, S. H., Zhang, G., A Multi-Objective Facility Location Model For Closed-Loop Supply Chain Network Under Uncertain Demand And Return, *Applied Mathematical Modelling*, 37 (2013) 4165-4176, 2013.
- Baptista, S., Gomes, M. I., & Barbosa-Povoa, A. P. (2012). A two-stage stochastic model for the design and planning of a multi-product closed loop supply chain. In *Computer Aided Chemical Engineering* (Vol. 30, pp. 412-416). Elsevier.

- Battini D., Closed Loop Supply Chain (CLSC): Economics, Modelling, Management And Control, *Int. J. Production Economics* 183, 319–321, 2017.
- Beamon, B.M. And Fernandes, C., Supply-Chain Network Configuration For Product Recovery, *Production Planning And Control*, 15 (3), 270–281, 2004.
- Bloemhof-Ruwaard, J.M., Van Wassenhove, L.N., Gabel, H.L. And Weaver, P.M., An Environmental Life Cycle Optimization Model For The European Pulp And Paper Industry, *Omega*, 24 (6), 615–629, 2005.
- Braz, A. C., De Mello, A. M., de Vasconcelos Gomes, L. A., & de Souza Nascimento, P. T. (2018). The bullwhip effect in closed-loop supply chains: A systematic literature review. *Journal of cleaner production*, 202, 376-389.
- Budak, E., Kapalı Devre Tedarik Zinciri Problemine Bulanık Karar Verme Yaklaşımı, Yüksek Lisans Tezi, Yıldız Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul, 2012.
- Cardoso, S. R., Barbosa-Póvoa, A. P. F., & Relvas, S. (2012). Designing and planning of closed-loop supply chains for risk and economical optimization. In *Computer Aided Chemical Engineering* (Vol. 30, pp. 447-451). Elsevier.
- Cardoso, S. R., Barbosa-Póvoa, A. P., & Relvas, S. (2016). Integrating financial risk measures into the design and planning of closed-loop supply chains. *Computers & Chemical Engineering*, 85, 105-123.
- Chen vd., Inventory Management in A Closed-Loop Supply Chain With Advance Demand Information, *Operations Research Letters* 45, 175–180, 2017.
- Chen, Y. W., Wang, L. C., Wang, A., & Chen, T. L. (2017). A particle swarm approach for optimizing a multi-stage closed loop supply chain for the solar cell industry. *Robotics and Computer-Integrated Manufacturing*, 43, 111-123.
- Choudhary, A., Sarkar, S., Settur, S., & Tiwari, M. K. (2015). A carbon market sensitive optimization model for integrated forward–reverse logistics. *International Journal of Production Economics*, 164, 433-444.
- Coenen, J., Van der Heijden, R. E., & van Riel, A. C. (2018). Understanding approaches to complexity and uncertainty in closed-loop supply chain management: Past findings and future directions. *Journal of Cleaner Production*, 201, 1-13.
- Das Ve Posinasetti, Addressing Environmental Concerns in Closed Loop Supply Chain Design And Planning, *Int. J. Production Economics* 163, 34–47, 2015.
- De La Fuente, M., Ros, L., & Cardoso, M., Integrating Forward And Reverse Supply Chains: Application To A Metal-Mechanic Company. *International Journal Of Production Economics*, 111(2), 782–792, 2008.
- 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.
- Easwaran, G. And Üster, H., A Closed-Loop Supply Chain Network Design Problem With Integrated Forward And Reverse Channel Decisions, *IIE Transactions*, 42 (11), 779–792, 2010.
- El-Sayed, M., Afia, N., & El-Kharbotly, A., A Stochastic Model For Forward– Reverse Logistics Network Design Under Risk. *Computers & Industrial Engineering*, 58(3), 423–431, 2010.
- Fleischmann, M., Beullens, P., Bloemhof-Ruwaard, J.M. And Van Wassenhove, L.N., The Impact Of Product Recovery On Logistics Network Design, *Production And Operations Management*, 10 (2), 156–173, 2001.
- Fleischmann, M., Bloemhof-Ruwaard, J.M., Dekker, R., Van Der Laan, E., Van Nunen, J.A.E.E. And Van Wassenhove, L.N., Quantitative Models For Reverse Logistics: A Review, *European Journal Of Operational Research*, 103 (1), 1–17, 1997.
- Francas, D., & Minner, S., Manufacturing Network Configuration in Supply Chains With Product Recovery. *Omega*, 37(4), 757–769, 2009.
- French, M. L., & LaForge, R. L. (2006). Closed-loop supply chains in process industries: An empirical study of producer re-use issues. *Journal of Operations Management*, 24(3), 271-286.
- Gaur, J., & Mani, V. (2018). Antecedents of closed-loop supply chain in emerging economies: A con-

- ceptual framework using stakeholder's perspective. *Resources, Conservation and Recycling*, 139, 219-227.
- Godichaud, M., & Amodeo, L. (2015). Efficient multi-objective optimization of supply chain with returned products. *Journal of Manufacturing Systems*, 37, 683-691.
- Govindan K. Ve Soleimani H., A Review Of Reverse Logistics And Closed-Loop Supply Chains: A Journal Of Cleaner Production Focus, *Journal Of Cleaner Production* 142, 371-384, 2017.
- Govindan vd., Reverse Logistics And Closed-Loop Supply Chain: A Comprehensive Review To Explore The Future, *European Journal Of Operational Research* 240, 603-626, 2015.
- Govindan, K., Mina, H., Esmaili, A., & Gholami-Zanjani, S. M. (2020). An integrated hybrid approach for circular supplier selection and closed loop supply chain network design under uncertainty. *Journal of Cleaner Production*, 242, 118317.
- Grant, D. B., & Banomyong, R., Design Of Closed-Loop Supply Chain And Product Recovery Management For Fast-Moving Consumer Goods: The Case Of A Single-Use Camera. *Asia Pacific Journal Of Marketing And Logistics*, 22(2), 232-246, 2010.
- Guide, V. D. R., Van Wassenhove, L. N., The Evolution Of Closed-Loop Supply Chain Research, *Operations Research*, 57(1), 10-18, 2009.
- Guide, V. D. R., Jayaraman V., Linton J. D., Building Contingency Planning For Closed-Loop Supply Chains With Product Recovery, *Journal Of Operations Management*, 21 (2003) 259-279, 2003.
- Hasani, A., Zegordi, S. H., & Nikbakhsh, E. Robust Closed-Loop Supply Chain Network Design For Perishable Goods in Agile Manufacturing Under Uncertainty. *International Journal Of Production Research*, 50(16), 4649-4669, 2012.
- Hasanov, P., Jaber, M. Y., & Tahirov, N. (2019). Four-level closed loop supply chain with remanufacturing. *Applied Mathematical Modelling*, 66, 141-155.
- He Y., Supply Risk Sharing In A Closed-Loop Supply Chain, *Int. J. Production Economics* 183, 39-52, 2017.
- Hu, P., Han, Z., Fu, H., & Han, D. (2016). Architecture and implementation of closed-loop machining system based on open STEP-NC controller. *The international journal of advanced manufacturing technology*, 83(5-8), 1361-1375.
- 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 and Recycling*, 137, 48-75.
- Jabbarzadeh, A., Haughton, 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.
- Jayaraman, V., Guide, V.D.R. And Srivastava, R., 1999, A Closed-Loop Logistics Model For Remanufacturing, *Journal Of The Operational Research Society*, 50 (5), 497- 508, 1999.
- Jayaraman, V., Production Planning For Closed-Loop Supply Chains With Product Recovery And Reuse: An Analytical Approach, *International Journal Of Production Research*, 44 (5), 981-998, 2006.
- Jindal, A., Sangwan, K.S., Closed Loop Supply Chain Network Design And Optimisation Using Fuzzy Mixed Integer Linear Programming Model, *International Journal Of Production Research*, Vol. 52, No. 14, 4156-4173, [Http://Dx.Doi.Org/10.1080/00207543.2013.861948](http://Dx.Doi.Org/10.1080/00207543.2013.861948), 2014.
- Kadambala D. vd., Closed Loop Supply Chain Networks: Designs For Energy and Time Value Efficiency, *Int. J. Production Economics* 183, 382-393, 2017.
- Kalaitzidou M. vd., Optimal Design Of Closed-Loop Supply Chain Networks With Multifunctional Nodes, *Computers And Chemical Engineering* 80, 73-91, 2015.
- Kannan, G., Sasikumar, P. And Devika, K., A Genetic Algorithm Approach For Solving A Closed Loop Supply Chain Model: A Case Of Battery Recycling, *Applied Mathematical Modeling*, 34 (3), 655-670, 2010.
- Kaya, O., & Urek, B. (2016). A mixed integer nonlinear programming model and heuristic solutions for location, inventory and pricing decisions in a closed loop supply chain. *Computers & Operations Research*, 65, 93-103.

- Kenné, J.-P., Dejax, P. And Gharbi, A., Production Planning Of A Hybrid Manufacturing-Remanufacturing System Under Uncertainty Within A Closed-Loop Supply Chain, *International Journal Of Production Economics*, 135 (1), 81–93, 2012.
- Kim, J., Do Chung, B., Kang, Y., & Jeong, B. (2018). Robust optimization model for closed-loop supply chain planning under reverse logistics flow and demand uncertainty. *Journal of Cleaner Production*, 196, 1314–1328.
- Kiritsis, D., Nguyen, V. K., & Stark, J. (2008). How closed-loop PLM improves Knowledge Management over the complete product lifecycle and enables the factory of the future. *International Journal of Product Lifecycle Management*, 3(1), 54–77.
- Krikke, H. R. R., Bloemhof-Ruwaard, J.M., Ve Van Wassenhove, L.N., Design Of Closed Loop Supply Chains, ERIM Report Series Reference No. ERS-2001-45-LIS, 2001a.
- Krikke, H., Bloemhof-Ruwaard, J. And Van Wassenhove, L.N., 2003, Concurrent Product And Closed-Loop Supply Chain Design With An Application To Refrigerators, *International Journal Of Production Research*, 41 (16), 3689–3719, 2003.
- Kumar, V. V., Liou, F. W., Balakrishnan, S. N., & Kumar, V. (2015). Economical impact of RFID implementation in remanufacturing: a Chaos-based Interactive Artificial Bee Colony approach. *Journal of Intelligent Manufacturing*, 26(4), 815–830.
- Lee, D. H., & Dong, M., A Heuristic Approach To Logistics Network Design For End-Of-Lease Computer Products Recovery. *Transportation Research Part E: Logistics And Transportation Review*, 44(3), 455–474, 2008.
- Listes, O., A Generic Stochastic Model For Supply-And-Return Network Design, *Computers & Operations Research*, 34, 417–442, 2007.
- Liu, Z., Li, K. W., Li, B. Y., Huang, J., & Tang, J. (2019). Impact of product-design strategies on the operations of a closed-loop supply chain. *Transportation Research Part E: Logistics and Transportation Review*, 124, 75–91.
- Lu, Z., & Bostel, N., A Facility Location Model For Logistics Systems Including Reverse Flows: The Case Of Remanufacturing Activities. *Computers & Operations Research*, 34(2), 299–323, 2007.
- Ma, H., & Li, X. (2018). Closed-loop supply chain network design for hazardous products with uncertain demands and returns. *Applied Soft Computing*, 68, 889–899.
- Martin, P., Guide, V. D. R., Jr., & Craighead, C. W., Supply Chain Sourcing in Remanufacturing Operations: An Empirical Investigation Of Remake Versus Buy. *Decision Sciences*, 41(2), 301–324, 2010.
- Matsumoto, M., & Umeda, Y., An Analysis Of Remanufacturing Practices in Japan. *Journal Of Remanufacturing*, 1(1), 1–11, 2011.
- Mollenkopf, D., Russo, I., & Frankel, R., The Returns Management Process in Supply Chain Strategy. *International Journal Of Physical Distribution & Logistics Management*, 37(7), 568–592, 2007.
- Olorunniwo, F. O., & Li, X., Information Sharing And Collaboration Practices in Reverse Logistics. *Supply Chain Management: An International Journal*, 15(6), 454–462, 2010.
- Otay İ., Geri Kazanımlı Kapalı Çevrim Tedarik Zinciri İçin Dağıtım Planlama, Doktora Tezi, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul, 2015.
- Özceylan E. vd., A Closed-Loop Supply Chain Network Design For Automotive Industry in Turkey, *Computers & Industrial Engineering* Xxx, Xxx–Xxx, 2017.
- Özceylan, E. And Paksoy, T., A Mixed Integer Programming Model For A Closed Loop Supply Chain Network, *International Journal Of Production Research*, 51 (3), 718–734, 2013a
- Özceylan, E., Paksoy, T. And Bektaş, T., Modeling And Optimizing The Integrated Problem Of Closed-Loop Supply Chain Network Design And Disassembly Line Balancing, *Transportation Research Part E*, 2013.
- Özceylan, E., Paksoy, T., Ve Bektaş, T., Modeling And Optimizing The Integrated Problem Of Closed-Loop Supply Chain Network Design And Disassembly Line Balancing, *Transportation Research Part E: Logistics And Transportation Review*, 61, 142–164, 2014.
- Özkır, V. And Başlıgil, H., Multi-Objective Optimization Of Closed-Loop Supply Chains in Uncertain Environment, *Journal Of Cleaner Production*, 41, 114–125, 2013.

- Özkır, V., Kapalı Çevrim Tedarik Zinciri Tasarımına Yönelik Karar Destek Modeli Önerisi, Doktora Tezi, Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü, İstanbul, 2009.
- Özmen, A., Kapalı Döngü Tedarik Zinciri Ağ Tasarımı: Türkiye Cep Telefonu Yeniden Üretimi Karma Tamsayılı Model Önerisi, Doktora Tezi, Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü, Bolu, 2013.
- Pagell, M., Wu, Z. And Murthy, N.N., The Supply Chain Implications Of Recycling, *Business Horizons*, 50 (2), 133–143, 2007.
- Paksoy, T. And Özceylan, E., Supply Chain Optimization With U-Type Assembly Line Balancing, *International Journal Of Production Research*, 50 (18), 5085– 5105, 2012.
- Paksoy, T., Bektaş, T. And Özceylan, E., Operational And Environmental Performance Measures İn A Multi-Product Closed-Loop Supply Chain, *Transportation Research Part E*, 47 (4), 532–546, 2011.
- Paydar vd. , An Engine Oil Closed-Loop Supply Chain Design Considering Collection Risk, *Computers And Chemical Engineering* 104, 38–55, 2017.
- Peng, H., Shen, N., Liao, H., Xue, H., & Wang, Q. (2020). Uncertainty factors, methods, and solutions of closed-loop supply chain—A review for current situation and future prospects. *Journal of Cleaner Production*, 120032.
- Pishvae, M. S., Jolai, F., & Razmi, J. (2009). A stochastic optimization model for integrated forward/reverse logistics network design. *Journal of Manufacturing Systems*, 28(4), 107-114.
- Pishvae, M.S. And Torabi, S.A., A Possibilistic Programming Approach For Closed-Loop Supply Chain Network Design Under Uncertainty, *Fuzzy Sets And Systems*, 161 (20), 2668–2683, 2010.
- Polo, A., Peña, N., Muñoz, D., Cañón, A., & Escobar, J. W. (2019). Robust design of a closed-loop supply chain under uncertainty conditions integrating financial criteria. *Omega*, 88, 110-132.
- Qiang, Q., Ke, K., Anderson, T. And Dong, J., The Closed-Loop Supply Chain Network With Competition, Distribution Channel Investment, And Uncertainties, *Omega*, 41 (2), 186–194, 2013,
- Qin, Z. And Ji, X., Logistics Network Design For Product Recovery in Fuzzy Environment, *European Journal Of Operational Research*, 202 (2), 479–490,2010.
- Ramanathan, R., An Empirical Analysis On The Influence Of Risk On Relationships Between Handling Of Product Returns And Customer Loyalty in Ecommerce. *International Journal Of Production Economics*, 130(2), 255–261, 2011.
- Ramezani, M., Kimiagari, A. M., Karimi, B., Hejazi, T.H., 2014, Closed-Loop Supply Chain Network Design Under A Fuzzy Environment, *Knowledge-Based Systems*, 59, 108–120, 2014.
- Ruimin Vd., Robust Environmental Closed-Loop Supply Chain Design Under Uncertainty, *Chaos, Solitons And Fractals* 89, 195–202, 2016.
- Salema, M.I.G., Póvoa, A.P.B. And Novais, A.Q., A Strategic And Tactical Model For Closed-Loop Supply Chains, *OR Spectrum*, 31 (3), 573–599, 2009.
- Santander, P., Sanchez, F. A. C., Boudaoud, H., & Camargo, M. (2020). Closed loop supply chain network for local and distributed plastic recycling for 3D printing: a MILP-based optimization approach. *Resources, Conservation and Recycling*, 154, 104531.
- Schenkel M. Vd, Creating Integral Value For Stakeholders in Closed Loop Supply Chains, *Journal Of Purchasing&Supply Management*, 21, 155–166, 2015.
- Schenkel, M., Krikke, H., Caniels, M. C., & Lambrechts, W. (2019). Vicious cycles that hinder value creation in closed loop supply chains: Experiences from the field. *Journal of cleaner production*, 223, 278-288.
- Schultmann, F., Zumkeller, M. Ve Rentz, O., Modeling Reverse Logistic Tasks Within Closed-Loop Supply Chains: An Example From The Automotive Industry, *European Journal Of Operational Research*, 171, 1033–1050, 2006.
- Shakourloo A. Vd., A New Model For More Effective Supplier Selection And Remanufacturing Process İn A Closed-Loop Supply Chain, *Applied Mathematical Modelling* 40, 9914–9931, 2016.
- Shekarian, E. (2019). A review of factors affecting closed-loop supply chain models. *Journal of Cleaner Production*, 119823.
- Shi, J., Zhang, G., & Sha, J., Optimal Production And Pricing Policy For A Closed Loop System.

- Resources, Conservation And Recycling, 55(6), 639–647, 2011a.
- Shimada T. Vd., Closed-Loop Supply Chain Activities in Japanese Home Appliance/Personal Computer Manufacturers: A Case Study, *International Journal Of Production Economics*, 2016.
- Sim, E., Jung, S., Kim, H., & Park, J. (2004, June). A generic network design for a closed-loop supply chain using genetic algorithm. In *Genetic and Evolutionary Computation Conference* (pp. 1214-1225). Springer, Berlin, Heidelberg.
- Soleimani H. Vd., Fuzzy Multi-Objective Sustainable And Green Closed-Loop Supply Chain Network Design, *Computers & Industrial Engineering* 109, 191–203, 2017.
- Soleimani, H., & Kannan, G. (2015). A hybrid particle swarm optimization and genetic algorithm for closed-loop supply chain network design in large-scale networks. *Applied Mathematical Modelling*, 39(14), 3990-4012.
- Soleimani, H., Seyyed-Esfahani, M., & Kannan, G., Incorporating Risk Measures in Closed-Loop Supply Chain Network Design. *International Journal Of Production Research*. 10.1080/00207543.2013.849823, 2013.
- Srivastava, S. K., Network Design For Reverse Logistics, *Omega*, 36: 535 – 548, 2008.
- Sundin, E., Ostlin, J., Ronnback, A. O., Lindahl, M., & Sandstrom, G. O., Remanufacturing Of Products Used In Product Service System Offerings. In *Manufacturing Systems And Technologies For The New Frontier* (Pp. 537–542). London: Springer, 2008.
- Talbot, S., Lefebvre, E., & Lefebvre, L. A. Closed-Loop Supply Chain Activities And Derived Benefits in Manufacturing SMES. *Journal Of Manufacturing Technology Management*, 18(6), 627–658, 2007.
- Thierry, M., Salomon, M. And Van Wassenhove L., Strategic Issues in Product Recovery Management, *California Management Review*, 37 (2), 114–135, 1995.
- Torğul B. , Nesnelerin İnterneti İle Kapalı Döngü Tedarik Zinciri Optimizasyonu: Yeni Bir Model Önerisi, Yüksek Lisans Tezi, Selçuk Üniversitesi, Fen Bilimleri Enstitüsü, Konya, 2015.
- Tsao Vd., Closed-Loop Supply Chain Network Designs Considering RFID Adoption, *Computers & Industrial Engineering* Xxx, Xxx–Xxx, 2016.
- Tuzkaya, G., & Gulsun, B., Evaluating Centralized Return Centers in A Reverse Logistics Network: An İntegrated Fuzzy Multi-Criteria Decision Approach. *International Journal Of Environmental Science & Technology*, 5(3), 339–352, 2008.
- Ürek B., A Mixed Integer Location, Inventory And Pricing Model For Closed Loop Supply Chains, Yüksek Lisans Tezi, Koç Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul, 2012.
- Üster, H., Easwaran, G., Akçali, E., & Çetinkaya, S. (2007). Benders decomposition with alternative multiple cuts for a multi-product closed-loop supply chain network design model. *Naval Research Logistics (NRL)*, 54(8), 890-907.
- Uster, H., Easwaran, G., Akcali, E., & Cetinkaya, S., Benders Decomposition With Alternative Multiple Cuts For A Multi-Product Closed-Loop Supply, 2007.
- Visich, J.K., Li, S., And Khumawala, B.M., Enhancing Product Recovery Value in Closed-Loop Supply Chains With RFID, *Journal Of Management Issues*, 19(3), Pp. 436–452, 2007.
- Vlachos, D., Georgiadis, P., & Iakovou, E. (2007). A system dynamics model for dynamic capacity planning of remanufacturing in closed-loop supply chains. *Computers & Operations Research*, 34(2), 367-394.
- Wang, H.-F. And Hsu, H.-W, A Closed-Loop Logistic Model With a Spanning-Tree Based Genetic Algorithm, *Computers And Operations Research*, 37 (2), 376–389, 2010a
- Wei, J. And Zhao, J., Reverse Channel Decisions For A Fuzzy Closed-Loop Supply Chain, *Applied Mathematical Modelling*, 37 (3), 1502–1513., 2013.
- Wu, H., Han, X., Yang, Q., & Pu, X. (2018). Production and coordination decisions in a closed-loop supply chain with remanufacturing cost disruptions when retailers compete. *Journal of Intelligent Manufacturing*, 29(1), 227-235.
- Xu, Z., Pokharel, S., Elomri, A., & Mutlu, F. (2017). Emission policies and their analysis for the design of hybrid and dedicated closed-loop supply chains. *Journal of Cleaner Production*, 142, 4152-4168.

- Yang, G.-F., Wang, Z.-P. And Li, X.-Q., The Optimization Of The Closed-Loop Supply Chain Network, *Transportation Research Part E*, 45 (1), 16–28, 2009.
- Yavari, M., & Geraeli, M. (2019). Heuristic method for robust optimization model for green closed-loop supply chain network design of perishable goods. *Journal of Cleaner Production*, 226, 282-305.
- 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.
- Yi, P., Huang, M., Guo, L., & Shi, T. (2016). A retailer oriented closed-loop supply chain network design for end of life construction machinery remanufacturing. *Journal of Cleaner Production*, 124, 191-203.
- Zeballos, L. J., Méndez, C. A., Barbosa-Povoa, A.P. And Novais, A. Q., 2014, Multi-Period Design And Planning Of Closed-Loop Supply Chains With uncertain Supply And Demand, *Computers And Chemical Engineering*, 66 (2014), 151–164, 2014.
- Zeballos, L., Gomes, M., Barbosa-Povoa, A. P. And Novais, A. Q., 2012, Addressing The Uncertain Quality And Quantity Of Returns in Closed-Loop Supply Chains, *Computers And Chemical Engineering*, 47, 237–247, 2012.
- Zhang, X., & Jin, C., The Pricing Model Construction Of Reverse Supply Chain Based On Game Theory. *International Conference On Electronic And Mechanical Engineering And Information Technology (EMEIT)*, 2011 (Vol. 4, Pp. 1880–1883). IEEE, 2011.
- Zhen, L., Huang, L., & Wang, W. (2019). Green and sustainable closed-loop supply chain network design under uncertainty. *Journal of Cleaner Production*, 227, 1195-1209.