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## Order fulfillment: warehouse and inventory models

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# Bibliography

- Abouee-Mehrizi, H., Berman, O., & Sharma, S. (2015). Optimal joint replenishment and transshipment policies in a multi-period inventory system with lost sales. *Operations Research*, *63*, 342–350.
- Acimovic, J., & Graves, S. C. (2015). Making better fulfillment decisions on the fly in an online retail environment. *Manufacturing & Service Operations Management*, *17*, 34–51.
- Acimovic, J., & Graves, S. C. (2017). Mitigating spillover in online retailing via replenishment. *Manufacturing & Service Operations Management*, *19*, 419–436.
- Agatz, N., Campbell, A., Fleischmann, M., & Savelsbergh, M. (2011). Time slot management in attended home delivery. *Transportation Science*, *45*, 435–449.
- Agatz, N., Fleischmann, M., & Van Nunen, J. (2008). E-fulfillment and multi-channel distribution—a review. *European Journal of Operational Research*, *187*, 339–356.
- Agrawal, N., & Smith, S. A. (2009). Multi-location inventory models for retail supply chain management. In N. Agrawal, & S. Smith (Eds.), *Retail Supply Chain Management - Quantitative Models and Empirical Studies*.
- Agrawal, V., Chao, X., & Seshadri, S. (2004). Dynamic balancing of inventory in supply chains. *European Journal of Operational Research*, *159*, 296–317.

- Alvarez, E., & van der Heijden, M. (2014). On two-echelon inventory systems with poisson demand and lost sales. *European journal of operational research*, *235*, 334–338.
- Andersson, J., & Melchior, P. (2001). A two-echelon inventory model with lost sales. *International Journal of Production Economics*, *69*, 307–315.
- Anupindi, R., & Bassok, Y. (1999). Centralization of stocks: Retailers vs. manufacturer. *Management Science*, *45*, 178–191.
- Au, K., Choi, T., & Yu, Y. (2008). Fashion retail forecasting by evolutionary neural networks. *International Journal of Production Economics*, *114*, 615–630.
- Axsäter, S. (2003). Evaluation of unidirectional lateral transshipments and substitutions in inventory systems. *European Journal of Operational Research*, *149*, 438–447.
- Axsäter, S., Howard, C., & Marklund, J. (2013). A distribution inventory model with transshipments from a support warehouse. *IIE Transactions*, *45*, 309–322.
- Aydinliyim, T., Pangburn, M. S., & Rabinovich, E. (2017). Inventory disclosure in online retailing. *European Journal of Operational Research*, *261*, 195–204.
- Banerjee, A., Burton, J., & Banerjee, S. (2003). A simulation study of lateral shipments in single supplier, multiple buyers supply chain networks. *International Journal of Production Economics*, *81*, 103–114.
- Bertrand, L., & Bookbinder, J. (1998). Stock redistribution in two-echelon logistics systems. *Journal of the Operational Research Society*, (pp. 966–975).
- Bijvank, M., Huh, W. T., Janakiraman, G., & Kang, W. (2014). Robustness of order-up-to policies in lost-sales inventory systems. *Operations Research*, *62*, 1040–1047.

- Bijvank, M., & Johansen, S. G. (2012). Periodic review lost-sales inventory models with compound Poisson demand and constant leadtimes of any length. *European Journal of Operational Research*, *220*, 106–114.
- Bijvank, M., & Vis, I. F. A. (2011). Lost-sales inventory theory: A review. *European Journal of Operational Research*, *215*, 1–13.
- Blauw Research (2012). Thuiswinkel markt monitor: Online verkopen januari t/m juni 2012. Retrieved from [https://www.thuiswinkel.org/data/uploads/marktonderzoeken/Thuiswinkel\\_Markt\\_Monitor/Infographic\\_Thuiswinkel\\_Markt\\_Monitor\\_2012-1.pdf](https://www.thuiswinkel.org/data/uploads/marktonderzoeken/Thuiswinkel_Markt_Monitor/Infographic_Thuiswinkel_Markt_Monitor_2012-1.pdf). Accessed May 12, 2018.
- Bozer, Y. A., & Aldarondo, F. J. (2018). A simulation-based comparison of two goods-to-person order picking systems in an online retail setting. *International Journal of Production Research*, (pp. 1–21).
- Brethauer, K. M., Mahar, S., & Venakataramanan, M. (2010). Inventory and distribution strategies for retail/e-tail organizations. *Computers & Industrial Engineering*, *58*, 119–132.
- Buchanan, D., & Abad, P. (1998). Optimal policy for a periodic review returnable inventory system. *IIE Transactions*, *30*, 1049–1055.
- Burness, R. C., & White, J. A. (1976). The traveling salesman location problem. *Transportation Science*, *10*, 348–360.
- Cachon, G. P. (2014). Retail store density and the cost of greenhouse gas emissions. *Management Science*, *60*, 1907–1925.
- Cardos, M., Guijarro, E., & Babiloni, E. (2017). On the estimation of on-hand stocks for base-stock policies and lost sales systems and its impact on service measures. *International Journal of Production Research*, *55*, 4680–4694.
- Caro, F., & Gallien, J. (2012). Clearance pricing optimization for a fast-fashion retailer. *Operations Research*, *60*, 1404–1422.

- Caron, F., Marchet, G., & Perego, A. (1998). Routing policies and coi-based storage policies in picker-to-part systems. *International Journal of Production Research*, *36*, 713–732.
- Chen, C. M., Gong, Y., De Koster, M. B. M., & Van Nunen, J. A. E. E. (2010). A flexible evaluative framework for order picking systems. *Production and Operations Management*, *19*, 70–82.
- Chew, E. P., & Tang, L. C. (1999). Travel time analysis for general item location assignment in a rectangular warehouse. *European Journal of Operational Research*, *112*, 582–597.
- Ching, W., Yuen, W., & Loh, A. (2003). An inventory model with returns and lateral transshipments. *Journal of the Operational Research Society*, *54*, 636–641.
- Chou, Y. C., Chen, Y. H., & Chen, H. M. (2012). Recency-based storage assignment and warehouse configuration for recurrent demands. *Computers and Industrial Engineering*, *62*, 880–889.
- Chu, L. Y., & Shen, Z.-J. M. (2010). A power-of-two ordering policy for one-warehouse multiretailer systems with stochastic demand. *Operations Research*, *58*, 492–502.
- Clark, A. J., & Scarf, H. (1960). Optimal policies for a multi-echelon inventory problem. *Management Science*, *6*, 475–490.
- Cunha, J. O., & Melo, R. A. (2016). On reformulations for the one-warehouse multi-retailer problem. *Annals of Operations Research*, *238*, 99–122.
- Daganzo, C. F. (2005). *Logistics Systems Analysis*. Springer Science & Business Media.
- Dallari, F., Marchet, G., & Melacini, M. (2009). Design of order picking system. *International Journal of Advanced Manufacturing Technology*, *42*, 1–12.

- De Kok, A., Lagodimos, A., & Seidel, H. (1994). *Stock Allocation in a Two-Echelon Distribution Network Under Service Constraints*. Research Report No. TUE/BDK/LBS/94-03 Eindhoven University of Technology.
- De Koster, M. B. M., Le-Duc, T., & Roodbergen, K. J. (2007). Design and control of warehouse order picking: A literature review. *European Journal of Operational Research*, *182*, 481–501.
- De Santis, R., Montanari, R., Vignali, G., & Bottani, E. (2018). An adapted ant colony optimization algorithm for the minimization of the travel distance of pickers in manual warehouses. *European Journal of Operational Research*, *267*, 120–137.
- Dekker, R., De Koster, M. B. M., Roodbergen, K. J., & Van Kalleveen, H. (2004). Improving order-picking response time at ankor's warehouse. *Interfaces*, *34*, 303–313.
- Dijkstra, A. S., & Roodbergen, K. J. (2017). Exact route-length formulas and a storage location assignment heuristic for picker-to-parts warehouses. *Transportation Research Part E: Logistics and Transportation Review*, *102*, 38–59.
- Diks, E. B., & De Kok, A. G. (1998). Optimal control of a divergent multi-echelon inventory system. *European Journal of Operational Research*, *111*, 75–97.
- Diks, E. B., & De Kok, A. G. (1999). Computational result for the control of a divergent  $n$ -echelon inventory system. *International Journal of Production Economics*, *59*, 327–336.
- Dogru, M. K., De Kok, A., & Van Houtum, G. (2009). A numerical study on the effect of the balance assumption in one-warehouse multi-retailer inventory systems. *Flexible Services and Manufacturing Journal*, *21*, 114–147.
- Dogru, M. K., De Kok, A. G., & Van Houtum, G. J. (2013). Newsvendor characterizations for one-warehouse multi-retailer inventory systems with discrete demand under the balance assumption. *Central European Journal of Operations Research*, *21*, 541–559.

- Ehrenthal, J., Honhon, D., & Van Woensel, T. (2014). Demand seasonality in retail inventory management. *European Journal of Operational Research*, *238*, 527–539.
- Eisenstein, D. D. (2008). Analysis and optimal design of discrete order picking technologies along a line. *Naval Research Logistics*, *55*, 350–362.
- Ene, S., & Öztürk, N. (2012). Storage location assignment and order picking optimization in the automotive industry. *The International Journal of Advanced Manufacturing Technology*, *60*, 787–797.
- Eppen, G., & Schrage, L. (1981). Centralized ordering policies in a multi-warehouse system with lead times and random demand. In L. Schwarz (Ed.), *Multi-Level Production/Inventory Control Systems: Theory and Practice* (pp. 51–67). Amsterdam: North-Holland.
- Federgruen, A., & Zipkin, P. (1984). Computational issues in an infinite-horizon, multiechelon inventory model. *Operations Research*, *32*, 818–836.
- Fernie, J., & Sparks, L. (2009). Retail logistics: changes and challenges. *Logistics and Retail Management: Emerging Issues and New Challenges in the Retail Supply Chain*, (pp. 3–37).
- Firouz, M., Keskin, B. B., & Melouk, S. H. (2017). An integrated supplier selection and inventory problem with multi-sourcing and lateral shipments. *Omega*, *70*, 77–93.
- Fleischmann, M., Bloemhof-Ruwaard, J., Dekker, R., Van der Laan, E., Van Nunen, J., & Van Wassenhove, L. (1997). Quantitative models for reverse logistics: A review. *European Journal of Operational Research*, *103*, 1–17.
- Frazelle, E. H., Hackman, S. T., Passy, U., & Platzman, L. K. (1994). *The Forward-Reserve Problem*. John Wiley & Sons, Inc.
- Van der Gaast, J. (2016). *Stochastic Models for Order Picking Systems*. Ph.D. thesis Erasmus University Rotterdam.

- Gademann, N., & Van de Velde, S. (2005). Order batching to minimize total travel time in a parallel-aisle warehouse. *IIE Transactions*, *37*, 63–75.
- Glazebrook, K., Paterson, C., Rauscher, S., & Archibald, T. (2015). Benefits of hybrid lateral transshipments in multi-item inventory systems under periodic replenishment. *Production and Operations Management*, *24*, 311–324.
- Goldberg, D., Katz-Rogozhnikov, D., Lu, Y., Sharma, M., & Squillante, M. (2016). Asymptotic optimality of constant-order policies for lost sales inventory models with large lead times. *Mathematics of Operations Research*, *41*, 898–913.
- Gong, Y., & De Koster, M. B. M. (2008). A polling-based dynamic order picking system for online retailers. *IIE Transactions (Institute of Industrial Engineers)*, *40*, 1070–1082.
- Gruen, T., Corsten, D., & Bharadwaj, S. (2002). Retail out-of-stocks: A worldwide examination of extent causes and consumer responses. Report. Grocery Manufacturers of America.
- Gu, J., Goetschalckx, M., & McGinnis, L. F. (2007). Research on warehouse operation: A comprehensive review. *European Journal of Operational Research*, *177*, 1–21.
- Haji, R., Neghab, M., & Baboli, A. (2009). Introducing a new ordering policy in a two-echelon inventory system with Poisson demand. *International Journal of Production Economics*, *117*, 212–218.
- Hall, R. W. (1993). Distance approximations for routing manual pickers in a warehouse. *IIE Transactions*, *25*, 76–87.
- Hausman, W. H., Schwarz, L. B., & Graves, S. C. (1976). Optimal storage assignment in automatic warehousing systems. *Management Science*, *22*, 629–638.
- Heragu, S. S., Du, L., Mantel, R. J., & Schuur, P. C. (2005). Mathematical model for warehouse design and product allocation. *International Journal of Production Research*, *43*, 327–338.



- Hill, R., Seifbarghy, M., & Smith, D. (2007). A two-echelon inventory model with lost sales. *European Journal of Operational Research*, *181*, 753–766.
- Hochmuth, C., & Köchel, P. (2012). How to order and transship in multi-location inventory systems: The simulation optimization approach. *International Journal of Production Economics*, *140*, 646–654.
- Howard, C., Marklund, J., Tan, T., & Reijnen, I. (2015). Inventory control in a spare parts distribution system with emergency stocks and pipeline information. *Manufacturing & Service Operations Management*, *17*, 142–156.
- Hsieh, L.-f., & Tsai, L. (2006). The optimum design of a warehouse system on order picking efficiency. *The International Journal of Advanced Manufacturing Technology*, *28*, 626–637.
- Hübner, A., Holzapfel, A., & Kuhn, H. (2015). Operations management in multi-channel retailing: An exploratory study. *Operations Management Research*, *8*, 84–100.
- Huh, W., & Janakiraman, G. (2010a). Base-stock policies in capacitated assembly systems: Convexity properties. *Naval Research Logistics*, *57*, 109–118.
- Huh, W., & Janakiraman, G. (2010b). On the optimal policy structure in serial inventory systems with lost sales. *Operations Research*, *58*, 486–491.
- Huh, W. T., Janakiraman, G., Muckstadt, J., & Rusmevichientong, P. (2009). Asymptotic optimality of order-up-to policies in lost sales inventory systems. *Management Science*, *55*, 404–420.
- Hwang, H., Oh, Y. H., & Lee, Y. K. (2004). An evaluation of routing policies for order-picking operations in low-level picker-to-part system. *International Journal of Production Research*, *42*, 3873–3889.
- Hwang, H. S., & Cho, G. S. (2006). A performance evaluation model for order picking warehouse design. *Computers and Industrial Engineering*, *51*, 335–342.

- 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*, *46*, 543–561.
- Jaillet, P. (1988). A priori solution of a traveling salesman problem in which a random subset of the customers are visited. *Operations Research*, *36*, 929–936.
- Jarvis, J. M., & McDowell, E. D. (1991). Optimal product layout in an order picking warehouse. *IIE Transactions*, *23*, 93–102.
- Jewkes, E., Lee, C., & Vickson, R. (2004). Product location, allocation and server home base location for an order picking line with multiple servers. *Computers and Operations Research*, *31*, 623–636.
- Jing, X., & Lewis, M. (2011). Stockouts in online retailing. *Journal of Marketing Research*, *48*, 342–354.
- Johnson, M. E., & Meller, R. D. (2002). Performance analysis of split-case sorting systems. *Manufacturing & Service Operations Management*, *4*, 258–274.
- Jönsson, H., & Silver, E. (1987). Analysis of a two-echelon inventory control system with complete redistribution. *Management Science*, *33*, 215–227.
- Kapalka, B. A., Katircioglu, K., & Puterman, M. L. (1999). Retail inventory control with lost sales, service constraints, and fractional lead times. *Production and Operations Management*, *8*, 393–408.
- Kelle, P., & Silver, E. (1989). Forecasting the returns of reusable containers. *Journal of Operations Management*, *8*, 17–35.
- Kiesmüller, G., & Van der Laan, E. (2001). An inventory model with dependent product demands and returns. *International Journal of Production Economics*, *72*, 73–87.
- Kim, D. J., Ferrin, D. L., & Raghav Rao, H. (2009). Trust and satisfaction, two stepping stones for successful e-commerce relationships: A longitudinal exploration. *Information Systems Research*, *20*, 237–257.

- Koufteros, X., Droge, C., Heim, G., Massad, N., & Vickery, S. K. (2014). Encounter Satisfaction in E-tailing: Are the relationships of order fulfillment service quality with its antecedents and consequences moderated by historical satisfaction? *Decision Sciences*, *45*, 5–48.
- Kunder, R., & Gudehus, T. (1975). Mittlere Wegzeiten beim eindimensionalen Kommissionieren. *Zeitschrift für Operations Research*, *19*, 53–72.
- Lawton, C. (2008). The war on returns. *Wall Street Journal*, *8*.
- Le-Duc, T., & De Koster, M. B. M. (2005). Travel distance estimation and storage zone optimization in a 2-block class-based storage strategy warehouse. *International Journal of Production Research*, *43*, 3561–3581.
- Lee, Y., Jung, J., & Jeon, Y. (2007). An effective lateral transshipment policy to improve service level in the supply chain. *International Journal of Production Economics*, *106*, 115–126.
- Levi, R., Janakiraman, G., & Nagarajan, M. (2008a). A 2-approximation algorithm for stochastic inventory control models with lost sales. *Mathematics of Operations Research*, *33*, 351–374.
- Levi, R., Roundy, R., Shmoys, D., & Sviridenko, M. (2008b). A constant approximation algorithm for the one-warehouse multiretailer problem. *Management Science*, *54*, 763–776.
- Lim, M. K., Mak, H.-Y., & Shen, Z.-J. M. (2017). Agility and proximity considerations in supply chain design. *Management Science*, *63*, 1026–1041.
- Lin, S., & Kernighan, B. W. (1973). An effective heuristic algorithm for the traveling-salesman problem. *Operations Research*, *21*, 498–516.
- Liu, F., Song, J., & Tong, J. (2016). Building supply chain resilience through virtual stockpile pooling. *Production and Operations Management*, *25*, 1745–1762.
- Mahar, S., Bretthauer, K. M., & Venkataramanan, M. (2009). The value of virtual pooling in dual sales channel supply chains. *European Journal of Operational Research*, *192*, 561–575.

- Mahar, S., Salzarulo, P. A., & Daniel Wright, P. (2012). Using online pickup site inclusion policies to manage demand in retail/E-tail organizations. *Computers and Operations Research*, *39*, 991–999.
- Mahar, S., & Wright, P. D. (2017). In-store pickup and returns for a dual channel retailer. *IEEE Transactions on Engineering Management*, *64*, 491–504.
- Mantrala, M. K., & Raman, K. (1999). Demand uncertainty and supplier's returns policies for a multi-store style-good retailer. *European Journal of Operational Research*, *115*, 270–284.
- Marchet, G., Melacini, M., & Perotti, S. (2015). Investigating order picking system adoption: A case-study-based approach. *International Journal of Logistics Research and Applications*, *18*, 82–98.
- Matusiak, M., De Koster, M. B. M., & Saarinen, J. (2017). Utilizing individual picker skills to improve order batching in a warehouse. *European Journal of Operational Research*, *263*, 888–899.
- McGavin, E., Schwarz, L., & Ward, J. (1993). Two-interval inventory-allocation policies in a one-warehouse  $N$ -identical-retailer distribution system. *Management Science*, *39*, 1092–1107.
- McGavin, E., Ward, J., & Schwarz, L. (1997). Balancing retailer inventories. *Operations Research*, *45*, 820–830.
- Meller, R. D. (1997). Optimal order-to-lane assignments in an order accumulation/sortation system. *IIE Transactions*, *29*, 293–301.
- Mitra, S. (2009). Analysis of a two-echelon inventory system with returns. *Omega*, *37*, 106–115.
- Mostard, J., & Teunter, R. (2006). The newsboy problem with resalable returns: A single period model and case study. *European Journal of Operational Research*, *169*, 81–96.
- Muppani, V. R., & Adil, G. K. (2008). A branch and bound algorithm for class based storage location assignment. *European Journal of Operational Research*, *189*, 492–507.

- Nagy, G., & Salhi, S. (2007). Location-routing: Issues, models and methods. *European Journal of Operational Research*, *177*, 649–672.
- Nahmias, S., & Smith, S. (1994). Optimizing inventory levels in a two-echelon retailer system with partial lost sales. *Management Science*, *40*, 582–596.
- Newell, G. F. (1973). Scheduling, location, transportation, and continuum mechanics: Some simple approximations to optimization problems. *SIAM Journal on Applied Mathematics*, *25*, 346–360.
- Noham, R., & Tzur, M. (2014). The single and multi-item transshipment problem with fixed transshipment costs. *Naval Research Logistics*, *61*, 637–664.
- Olsson, F. (2015). Emergency lateral transshipments in a two-location inventory system with positive transshipment leadtimes. *European Journal of Operational Research*, *242*, 424–433.
- Pan, J. C.-H., & Shih, P.-H. (2008). Evaluation of the throughput of a multiple-picker order picking system with congestion consideration. *Computers & Industrial Engineering*, *55*, 379–389.
- Pan, J. C. H., Shih, P. H., & Wu, M. H. (2012). Storage assignment problem with travel distance and blocking considerations for a picker-to-part order picking system. *Computers & Industrial Engineering*, *62*, 527–535.
- Pan, J. C.-H., Shih, P.-H., Wu, M.-H., & Lin, J.-H. (2015). A storage assignment heuristic method based on genetic algorithm for a pick-and-pass warehousing system. *Computers & Industrial Engineering*, *81*, 1–13.
- Parikh, P. J., & Meller, R. D. (2010). A travel-time model for a person-onboard order picking system. *European Journal of Operational Research*, *200*, 385–394.
- Paterson, C., Kiesmüller, G., Teunter, R., & Glazebrook, K. (2011). Inventory models with lateral transshipments: A review. *European Journal of Operational Research*, *210*, 125–136.

- Paterson, C., Teunter, R., & Glazebrook, K. (2012). Enhanced lateral transshipments in a multi-location inventory system. *European Journal of Operational Research*, *221*, 317–327.
- Paul, B., & Rajendran, C. (2011). Rationing mechanisms and inventory control-policy parameters for a divergent supply chain operating with lost sales and costs of review. *Computers & Operations Research*, *38*, 1117–1130.
- Petersen, C. G., & Aase, G. (2004). A comparison of picking, storage, and routing policies in manual order picking. *International Journal of Production Economics*, *92*, 11–19.
- Petersen, C. G., & Schmenner, R. W. (1999). An evaluation of routing and volume-based storage policies in an order picking operation. *Decision Sciences*, *30*, 481–501.
- Porteus, E. L. (2002). *Foundations of Stochastic Inventory Theory*. Stanford University Press.
- Puterman, M. (2005). *Markov Decision Processes: Discrete Stochastic Dynamic Programming*. Wiley.
- Ramakrishna, K. S., Sharafali, M., & Lim, Y. F. (2015). A two-item two-warehouse periodic review inventory model with transshipment. *Annals of Operations Research*, *233*, 365–381.
- Rao, S., Griffis, S. E., & Goldsby, T. J. (2011). Failure to deliver? Linking online order fulfillment glitches with future purchase behavior. *Journal of Operations Management*, *29*, 692–703.
- Rao, S. S., & Adil, G. K. (2013a). Class-based storage with exact s-shaped traversal routing in low-level picker-to-part systems. *International Journal of Production Research*, *51*, 4979–4996.
- Rao, S. S., & Adil, G. K. (2013b). Optimal class boundaries, number of aisles, and pick list size for low-level order picking systems. *IIE Transactions*, *45*, 1309–1321.

- Ratliff, H. D., & Rosenthal, A. S. (1983). Order-picking in a rectangular warehouse : A solvable case of the traveling salesman problem. *Operations Research*, *31*, 507–521.
- Roodbergen, K. J., & De Koster, M. B. M. (2001). Routing methods for warehouses with multiple cross aisles. *International Journal of Production Research*, *39*, 1865–1883.
- Roodbergen, K. J., & Vis, I. F. A. (2006). A model for warehouse layout. *IIE Transactions*, *38*, 799–811.
- Schrotenboer, A. H., Wruck, S., Roodbergen, K. J., Veenstra, M., & Dijkstra, A. S. (2017). Order picker routing with product returns and interaction delays. *International Journal of Production Research*, *55*, 6394–6406.
- Schwarz, L. B. (1981). *Multi-Level Production/Inventory Control Systems: Theory and Practice* volume 16. North Holland.
- Seifbarghy, M., & Jokar, M. (2006). Cost evaluation of a two-echelon inventory system with lost sales and approximately Poisson demand. *International Journal of Production Economics*, *102*, 244–254.
- Shen, Z.-J., Shu, J., Simchi-Levi, D., Teo, C.-P., & Zhang, J. (2009). Approximation algorithms for general one-warehouse multi-retailer systems. *Naval Research Logistics*, *56*, 642–658.
- Solyah, O., & Süral, H. (2012). The one-warehouse multi-retailer problem: Reformulation, classification, and computational results. *Annals of Operations Research*, *196*, 517–541.
- Statista (2018a). E-commerce share of total global retail sales from 2015 to 2021. Retrieved from <https://www.statista.com/statistics/534123/e-commerce-share-of-retail-sales-worldwide/>. Accessed May 12, 2018.
- Statista (2018b). Value of internet retail sales monthly in the United Kingdom (UK) from January 2013 to June 2017 (in million GBP). Retrieved from <https://www.statista.com/statistics/>

- 380070/uk-internet-retail-monthly-sales-value/. Accessed May 12, 2018.
- Stauffer, G. (2012). Using the economical order quantity formula for inventory control in one-warehouse multiretailer systems. *Naval Research Logistics*, *59*, 285–297.
- Stenius, O., Karaarslan, A., Marklund, J., & De Kok, A. (2016). Exact analysis of divergent inventory systems with time-based shipment consolidation and compound poisson demand. *Operations Research*, .
- Tai, A., & Ching, W. (2014). Optimal inventory policy for a Markovian two-echelon system with returns and lateral transshipment. *International Journal of Production Economics*, *151*, 48–55.
- Thangam, A., & Uthayakumar, R. (2009). A two-level distribution inventory system with stochastic lead time at the lower echelon. *The International Journal of Advanced Manufacturing Technology*, *41*, 1208–1220.
- Theys, C., Bräysy, O., Dullaert, W., & Raa, B. (2010). Using a TSP heuristic for routing order pickers in warehouses. *European Journal of Operational Research*, *200*, 755–763.
- Thomas, L. M., & Meller, R. D. (2014). Analytical models for warehouse configuration. *IIE Transactions*, *46*, 928–947.
- Thuiswinkel (2017). Thuiswinkel markt monitor q1 2017. Retrieved from [https://www.thuiswinkel.org/data/uploads/marktonderzoeken/thuiswinkel\\_markt\\_monitor/Infographic\\_Thuiswinkel\\_Markt\\_Monitor\\_2017\\_1.pdf](https://www.thuiswinkel.org/data/uploads/marktonderzoeken/thuiswinkel_markt_monitor/Infographic_Thuiswinkel_Markt_Monitor_2017_1.pdf). Accessed May 12, 2018.
- Tompkins, J. A., White, J. A., Bozer, Y. A., & Tanchoco, J. M. A. (2010). *Facilities Planning*. John Wiley & Sons, Inc.
- UPS (2016). Pulse of the online shopper. Retrieved from <https://solvers.ups.com/ups-pulse-of-the-online-shopper/>. Accessed April 13, 2017.



- Van der Heijden, M. (2000). Near cost-optimal inventory control policies for divergent networks under fill rate constraints. *International Journal of Production Economics*, *63*, 161–179.
- Van der Heijden, M., Diks, E., & De Kok, A. (1997). Stock allocation in general multi-echelon distribution systems with  $(r, s)$  order-up-to-policies. *International Journal of Production Economics*, *49*, 157–174.
- Van Donselaar, K., & Wijngaard, J. (1987). Commonality and safety stocks. *Engineering Costs and Production Economics*, *12*, 197–204.
- Van Gils, T., Ramaekers, K., Caris, A., & De Koster, M. B. M. (2018). Designing efficient order picking systems by combining planning problems: State-of-the-art classification and review. *European Journal of Operational Research*, *267*, 1–15.
- Verhoef, P., & Sloot, L. (2006). Out-of-stock: Reactions, antecedents, management solutions, and a future perspective. In M. Krafft, & M. Mantrala (Eds.), *Retailing in the 21st Century: Current and Future Trends* (pp. 239–253). Springer Publishers, Philadelphia, Pennsylvania, USA.
- Xin, L., & Goldberg, D. (2016). Optimality gap of constant-order policies decays exponentially in the lead time for lost sales models. *Operations Research*, *64*, 1556–1565.
- Xu, P. J., Allgor, R., & Graves, S. C. (2009). Benefits of reevaluating real-time order fulfillment decisions. *Manufacturing & Service Operations Management*, *11*, 340–355.
- Zalando (2018). Annual report 2017. Retrieved from [https://corporate.zalando.com/sites/default/files/media-download/zalando\\_se\\_annual\\_report\\_2017.pdf](https://corporate.zalando.com/sites/default/files/media-download/zalando_se_annual_report_2017.pdf). Accessed May 12, 2018.
- Zhao, F., Wu, D., Liang, L., & Dolgui, A. (2016). Lateral inventory transshipment problem in online-to-offline supply chain. *International Journal of Production Research*, *54*, 1951–1963.
- Zipkin, P. (2008). Old and new methods for lost-sales inventory systems. *Operations Research*, *56*, 1256–1263.