Strategy Analysis of Lateral Transshipment for Material Risk Pooling

李育典、柯千禾

E-mail: 9510689@mail.dyu.edu.tw

ABSTRACT

Meeting unstable demands is a crucial task for material supply chain management. Risk pooling through lateral transshipment has been proven as an effective logic to improve material supply and to reduce total system costs. The purpose of the study is to analyze transshipment strategy using simulation techniques with different lead times of material supply. A central warehouse with multiple manufactures is analyzed in the research. To eliminate imminent shortage, materials are transshipped from manufacturing plants that have sufficient supplies to the others that starve for materials. Strategies for deploying materials including priority and quantity are investigated. Three scenarios with different material lead times, demands, transportation costs, and tardiness penalties are studied. Simulation results show that TBAPRI is the most profitable transshipment strategy to improve material shortage and system costs. In addition, the research identifies that pooling risk through lateral transshipment is not advantageous when transportation cost is much higher than tardiness penalty.

Keywords : Supply Chain ; Risk Pooling ; Lateral Transshipment ; Simulation

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REFERENCES

參考文獻 [1] Houlihan, J.B., Supply Chain Management, Proceedings of the 19th International Technical Conference of the British Production and Inventory, 1984.

[2] Christopher,M., Logistics and Supply Chain Management: Strate for Reducing Costs and Improving Service,Pitman, London, 1992.

[3] David F. Ross, Competing through Supply Chain Management: Creating Market-Winning Strategies Through Supply Chain Partnership, London: Chapman&Hall, 1997.

[4] Cooper, R. G., Perspective: Third-Generation New Product Processes, Journal of Product Innovation Management, Vol.11, pp.3-14, 1994.

[5] Bloomberg, David J., Adrian Murray, and Joe B. Hanna, The Management of Integrated Logistics, 2d ed. Sydney: Prentice-Hill of Australia Pt. Ltd., 1998.

[6] Johnson, J. and Mattson, L. G., Interorganizational Relations in Industrial Systems: A Network Approach Compared with the Transactional Cost Approach, International Studies of Management and Organization, Vol. XⅧ, No.1, pp.34-48, 1987.

[7] Frentzel, D. G. & Sease, G. J., Logistics Taking Down the Walls. Annual Conference Proceedings, CLM, pp.643-654., 1996.

[8] Silver, E. A. et al., Inventory Management and Production Planning and Scheduling, 3 ’ rd ed., Wiley Press, 1998.

[9] Axsater, S., Simple solution procedures for a class of two-echelon inventory problems, Operations Research, Vol. 38, pp.64-69, 1990a.

[10] Axsater, S., Modeling emergency lateral transshipments in inventory system, Management Science, Vol. 36, pp. 1329-1338, 1990b.

[11] Tagaras G., Cohen M.A., Pooling in two-location inventory inventory systems with non-negligible replenishment lead time, Management Science, Vol.38, pp.1067-1083, 1992.

[12] Avijit Banerjeea, Jonathan Burtonb, Snehamay Banerjeec, A simulation study of lateral shipments in single supplier, multiple buyers supply chain networks, Int. J. Production Economics, pp.81 – 82, 103 – 114, 2003.

[13] Herer, Y. T., and Tzur, M., The dynamic transshipment problem, Naval Research Logistics, Vol. 48, pp. 386-408, 2001.

[14] Zeigler, B.P.,“ Theory of the Modeling and Simulation ”, John Wiley and Sons, New York, 1976.
[15] Towill, D.R.,“ Supply Chain Dynamics, ” Industrial Journal of Computer Integrated Manufacturing, Vol.4, No.4, pp.197-208,1991.
[16] Reichelt, K., and Lyneis, J.,“ The use of simulation to unravel the detailed complexities of projects and project management, ” System Dynamics in Economic and Financial, Vol.5, pp.78-87. 1998.
[17] Hafeez, K., Griffiths, M., Griffiths, J., and Naim M. M.,“ Systems design of a two-echelon steel industry supply chain ” International Journal of Production Economics, Vol.45, pp.121-130, 1996.
[18] Lee HL. A multi-echelon inventory model for repairable items with emergency lateral transshipments. Management Science, pp.1302±16, 1987.
[19] Law, A. M., and Kelton, W. D.,“ Simulation Modeling and Analysis, ” McGraw-Hill, Second Edition, 1991.
[20] Banks, J., Carson, J., and Nelson B.“ Discrete-Event System Simulation ”, Prentice Hall,Inc.,New Jersey, 1995.
[21] 張有恒，「物流管理」，華泰文化事業公司，1998。
[22] 張煦逸，民國八十一年，「進銷存系統之建立與實務之應用」，碩士論文，國立中興大學企業管理研究所。
[23] 許宏熙，民國八十九年，「供應鏈理論應用於營建物料規劃之研究-以預鑄廠鋼筋材料為例」，碩士論文，台灣大學土木工程研究所。
[24] 江靜芳，民國八十九年，「精簡營建於預拌混凝土供應鏈應用之研」，碩士論文，國立中央大學土木工程研究所。
[25] 林蔚菁，民國九十一年，「系統模擬於鋼筋供應鏈管理之研究」，碩士論文，朝陽科技大學營建工程系。
[26] 潘乃欣、楊明山，民國八十八年，「存貨理論在營建專案物料採購計劃之應用」，第一屆營建管理學術研討會，台灣科技大學。
[27] 林則孟，”系統模擬理論與應用”，滄海書局，2001。
[28] 林宏澤、林清泉，民國八十年，「系統模擬」,高立圖書有限公司，台北，1991。