BAB 5

KESIMPULAN DAN SARAN

Bab kesimpulan dan saran berisi kesimpulan yang dihasilkan dari penelitian ini serta saran untuk penelitian selanjutnya.

5.1 Kesimpulan

Berdasarkan penelitian yang telah dilakukan, kesimpulan yang dapat ditarik adalah Model penentuan rute untuk *inbound* dan *outbound distribution* dengan *hybrid hub and spoke model* yang mempertimbangkan batasan *time windows* telah berhasil dirancang. Model ini dirancang dengan menggunakan model VRPBTW dan *Hybrid hub and spoke* sebagai dasar pembuatan model. Modifikasi yang diberikan ada pada perhitungan batasan waktu di *hub*, perhitungan waktu keberangkatan kendaraan dari depot dan beberapa penambahan kendala seperti *subtour elimination constraint*, larangan rute yang berhenti di depot terlebih dahulu dan kendala yang memastikan bahwa pengambilan barang ke *supplier* dilakukan setelah pengiriman barang ke konsumen selesai.

5.2 Saran

Berdasarkan penelitian yang telah dilakukan, saran yang dapat diberikan adalah untuk memungkinkan *multi pickup* di *supplier* sehingga memberikan effisiensi yang lebih tinggi. Selain itu penggunaan kasus

nyata dengan data permintaan dan waktu tempuh yang stokastik mungkin dapat digunakan supaya lebih mendekati kenyataan. Penyelesaian model dengan menggunakan algoritma metaheuristik dapat dilakukan agar dapat memotong waktu penyelesaian

DAFTAR PUSTAKA

Boonmee, C., Kasemset, C. (2015). " Optimization of Distribution Network with *Backhaul* ". *Department of Industrial Engineering Chiang Mai University.*

Chen, W., He, K., Fang, X. (2014). " Optimization of Hybrid *Hub*–and-Spoke Network Operation for Less-Than-Truckload Freight Transportation Considering Incremental Quantity Discount ". *Mathematical Problems in Engineering.* doi : 10.1155/2014/830632

Dantzing, G., & Ramser, J. (1959). The Truck Dispatching Problem. *Management Science*, 80-91. doi: http://dx.doi.org/10.1287/mnsc.6.1.80

Duhamel, C., Potvin, J. Y., Rousseau, J.M. (1997). " A Tabu Search Heuristic for The Vehicle Routing Problem with *Backhaul*s and Time Windows ". *Transportation Science,* 31(1), 49-59.

El-Sherbeny, N. A. (2010). " Vehicle Routing with Time Windows: An Overview of Exact, Heuristic and Metaheuristic Methods ". *Journal of King Saud University (Science)*, 22, 123-131. doi : 10.1016/j.jksus.2010.03.002.

Goetschalckx, M., Jacobs-Blecha, C. (1989). " The Vehicle Routing Problem with *Backhaul*s ". *European Journal of Operational Research,* 39-51.

Gupta, S. M. (2013). *Reverse Supply Chains (Issues and Analysis).*1 st ed. CRC Press. Boca Raton. doi : 10.1201/b13749

60

Koch, H., Bortfeldt, A., Wascher, G. (2018). " A Hybrid Algorithm for The Vehicle Routing Problem with *Backhaul*s, Time Windows and Three-Dimensional Loading Constraints ". *OR Spectrum.* doi : 10.1007/s00291-018-0506-6.

Lee, J. H., Moon, I. (2014). " A Hybrid *Hub*-and-Spoke Postal Logistics Network with Realistic Restrictions : A Case Study of Korea Post ". *Expert System with Applications.* doi : 10.1016/j.eswa.2014.02.027

Lewis, A., Lagrange, Patterson, D., Gallop, N. (2007). " South London Freight Consolidation Centre Feasibility Study " . *Transport and Travel Research Ltd.*

Lin, L., Tao, L. (2011). " Solving Mixed Vehicle Routing Problem with *Backhaul*s by Adaptive Memory Programming Methodology ". *Third International Conference on Measuring Technology and Mechatronics Automation.* doi : 10.1109/ICMTMA.2011.648

Liu, J., Li, C. L., Chan, C.Y. (2003). " Mixed Truck Delivery Systems with Both *Hub*-and-Spoke and Direct Shipment ". *Transportation Research Part E Logistics and Transportation Review,* 39(4). doi : 10.1016/SI1366-5545(03)00005-X

Tompkins, B., Ferrell. C. (2011). *Benchmarking & Best Practices*. Supply Chain Consortium.

Toth, P. & Vigo, D. (2002). " Models, Relaxations and Exact Approaches for the Capacitated Vehicle Routing Problem ". *Discrete Applied Mathematics 123*, 487-512.

Wang, X., Cao, H. (2008). " A Dynamic Vehicle Routing Problem with *Backhaul* and Time Windows ". IEEE *International Conference on Service Operations*

and Logistics, and Informatics. 1256-1261. doi :
10.1009/SOLI.2008.4686592

Yan, X., Jinghui, W., Liqun, Z. (2012). " An Express Transportation Model of *Hub*-and-Spoke Network with Distribution Center Group ". *Proceedings of the 2012 International Conference of MCSA.* 191, 467-472.

Zapfel, G., Wasner, M. (2002). " Planning and Optimization of *Hub*-and-Spoke Transportation Network of Cooperative Third-Party Logistics Providers ". *International Journal of Production Economiscs.* 78 (2), 207-220. doi : 10.1016/S0925-5273(00)00152-3

Zhang, J., Wu, Y., Liu, P. (2007). " Routing Problem for Hybrid *Hub*-and-Spoke Transportation Network : A Case Study of a LTL Carrier ". *International Conference on Automation and Logistics.* doi : 10.1109/ICAL.2007.4338551