Optimisation Methods for Customers Management Process in Service-Oriented Circular Supply Chain

Aurelija Burinskienė

Department of Business Technologies and Entrepreneurship, Vilnius Gediminas Technical University, LT-10223, Vilnius, Lithuania
aurelija.burinskiene@vgtu.lt

Abstract. Researchers are giving greater attention to the concept of the circular supply chain since 2014. The circular supply chain involves more processes than linear supply chain, including returns delivery management, product recovery, its recycling, reproduction and reuse. The emergence of customers' management process must be included into the development of supply chain to reach non-fragmented evolution of relevant functional logistics area since circular supply chain has more activities and brings a need for investigation of customers management aspect. A review of scientific literature will be carried seeking to extend the knowledge about the service-oriented circular supply chain. A revision of recent scientific papers is provided, aiming to identify the optimisation methods which are used for service-oriented circular supply chain and covered process analysis. Further, the methods covering customer management processes are elucidated, and the set of metaheuristic algorithms for the optimisation of these processes is proposed. Finally, the findings and limitations of the research are presented.

Keywords: Service-oriented circular supply chain, optimisation, methods, analysis, customers' management process..

1. Introduction

The change in company management processes leads to the improvement of customers' service. Many organisations optimise resources in processes, including the customers' management process as well. On the other hand, companies could add value to service by switching to circular supply chain, since "circular" way focus on continuous product cycling, including the products' collection, refurbishment and the reuse of materials.

Analysis of the scientific literature shows the lack of research on the optimisation of customers' management process in the service-oriented circular supply chain because it is front line service, which requires quick respond and the fulfilment of customers' orders, delivery on time and in proper quantity, the revision of complaints, the collection of returns, and, also, the performance of other customers related activities. The optimisation of resources in this process is particularly important.

The paper reveals customers' management process in a broader scope and defines the optimisation methods applicable to the case of service-oriented circular supply chain.

2. The definition of customers' management process

This study has been administered by mainly using secondary data sources. Secondary data includes various books, research works, journals and works of undergraduate and postgraduate students i.e. theses, projects, etc. These are collected from the various institutions and organizations. Urban and Regional Planning discipline and Architecture Discipline of Khulna University were the sources of those secondary data. The tactic includes analysis of the info on the case study area to spot the main constraints which impede the affordability of the actual group i.e. middle-income group during this case.

2.1. A Brief Overview of the Sonadanga Residential District and Therefore the Major Income Group

Customers' management process consists of two parts: Customers' service management and Customers' relationship management. Customers' service management is managing services between buyers and sellers. There are several authors that are researching customers' service management, these are Cui 2014; Langer, Loidl & Nerb 1999; Ossipov 2005; Robert 1991 and others.

Customers' relationship management is well-known model for managing the relations of company with clients and consumers. Also, there are scientists interesting in customers' relationship management. The authors Zhou, Min & Gen 2002; 2003 have delivered studies in this field.

If companies are service-oriented the interaction of employee with customers must get higher attention. In particular, many modern management techniques, like

Lean, ITIL and other, are highlighting customers' service.

Aiming to create a circular supply chain, producers or traders need to move to functional service models, in which customers buy services or use products rather than own it. Producers retain ownership of products and are therefore more motivated extend the product cycle and increase the reuse and recycling rates of used products.

Depending on how quickly products are collected from consumers, reach recycling sites and how quickly they are processed, resources are saved. In the next section the methods used for modelling service-oriented circular supply chain are presented.

3. Methods used for modeling service-oriented circular supply chain

Over time, an impressive concern is evident among scientists to analyse nonlinear systems. The approach to such systems has developed fundamentally new concepts and methods, mainly in mathematics and the natural sciences. In operations studies, the application of such methods is too early but has huge potential for analysing the behavior of service-oriented circular supply chain as a system. Basically, for the investigation if resources are allocated efficiently or conditions are proper for optimal resource allocation aiming to maximise output.

The authors apply the following modeling techniques for the research of service-oriented circular supply chain: service network, systematic models, system dynamics and others as specified in Table 1. Simulation modeling models are also widely used among others.

Table 1: Modelling service-oriented circular supply chain

The structural dimension	Analytical category	
Service-oriented circular supply chain	Participant	Producer, distributor, trader, shipping company
	The level of analysis	Circuit, service network (two-echelon, N-echelon), function
	Process	Service Network Design, Customers' demand management, Stock Management, Shipping and Delivery Management, Return Management
Modelling technique	The purpose of model	Normative – stochastic, descriptive – stochastic, normative – deterministic, descriptive – deterministic
	The type of model	Analytical and Mathematical programming models, Hybrid models, etc.
	The technique of modelling	Systematic Models, System Dynamics, Artificial Intelligence, etc.
	The method applied for solution	Queuing modelling, Simulation of System Dynamics, Construction of Genetic algorithms, Evolutionary algorithms, etc.

Some of these models are used for service-oriented circular supply chain modeling, which is investigated to include aspects of certainty and uncertainty. Therefore, there is an unpredictable difference between deterministic systems that manifest themselves in predictive behavior and statistical series that reflect random or stochastic behavior. The chaotic behavior of these series was generally interpreted as stochastic, and when evaluating linear models, awkward observations were classified as random.

4. Review of methods

To follow latest trends in the mathematical formulations, the hierarchical view could be applied by identifying model type, technique and the specific methods in the category.

There are five main categories applicable: the category of mathematical programming, simulation methods, heuristic methods, hybrid models and analytical models. The modelling techniques are different by nature and are dealing with single and multiple objectives.

Many studies focus on the application of optimisation methods. Also, in service-oriented circular supply chain various methods have been applied, like multi-objective mixed integer linear programming, variation inequality, system dynamic, discrete events, fuzzy logic, Markov chains; life cycle analysis and input-output analysis, but others have not yet been researched.

Based on the literature, mathematical programming methods are used for the analysis of service-oriented circular supply chain. Artificial intelligence methods such as Markov chains, Petri nets, case-based reasoning, Grey system and Neighborhood rough sets have been presented in studies analysing the service-oriented circular supply chain.

It is important to mention that the authors do not apply meta heuristic methods for process studies. Metaheuristic methods (e.g., particle swarm optimisation, ant colony optimisation) are popular in supply chain research. It should be noted that evolutionary, genetic, and other algorithms have already been recognised by the authors as suitable for addressing supply chain optimisation issues (Vergara, Khouja, & Michalewicz, 2002).

All the above stated methods include forward and reverse flow analysis and environmental topics. In addition, the service-oriented circular supply chain could be a study from a variety of perspectives. The research focuses on several applications of the methods, but new research could be presented, considering the methods used for research related to customers' management process.

The application of meta heuristic methods for processes studies. There are many process studies important for service-oriented circular supply chain. Author selects five processes such as: order management, order delivery management, return

management, customers' service management, customers' relationship management for further analysis.

Order management the process includes ordering patterns by frequency, size, season, and content. These models are researched based on the customer base. The customer order size and frequency fluctuations could be treated as multi-objective one, which includes various factors important for volume forecasting. In such cases genetic and other algorithms allow to search for optimal solution.

Table 2: Hierarchy of qualitative methods and models for researching service-oriented circular supply chain

Model type	Model technique	Solution method	Authors researching service-oriented circular supply chain
Mathematical programming method	Single objective	Bi-level linear programming	Kuo et al. (2011)
	Multiple objective	Multi-objective mixed integer linear programming	
			Wang et al. (2020)
		Fuzzy-goal programming	
		Polynomial dynamic programming	Selim et al. (2008)
			Rasti-Barzoki et al. (2015)
		Queuing model	
		Non-linear programming	Zhou et al. (2013)
		Variation inequality	Hifi et al. (2009)
			Wang et al. (2012)
Simulation methods	System dynamic (SD)		Samuel et al. (2010)
			Sidola et al. (2011)
	Discrete event (DES)		Schmitt et al. (2009)
	Business game	Simulation game	Anderson et al. (2000)
Heuristic methods	Simple heuristic	Simulated annealing heuristics	Daniel et al. (2005)
	Artificial intelligence techniques	Markov chains	Raghavan et al. (1999)
		Object-oriented petri nets	Dong et al. (2001)
		Case based reasoning	Kwon et al. (2007)
		Bayesian network modelling	Ojha et al. (2018)
		Fuzzy logic	
		Artificial Neural network	Krikke et al. (2005)
		Grey system and rough sets	Kuo et al. (2010)
		Neighbourhood rough sets	Bai et al. (2010)
			Bai et al. (2012)
	Meta heuristic	Genetic Algorithm	Altiparmak et al. (2006)
		Multi-objective evolutionary Algorithm	Bandyopadhyay et al. (2014)
			Babu et al. (2007)
		Multi-objective differential evolution algorithm	
			Bachlaus et al. (2008)
		Hybrid taguchi particle swarm optimisation	
			Silva et al. (2009)
		Ant Colony Optimization	
		Greedy Randomised Adaptive search procedure	Lee et al. (2010)
Hybrid models	Hybrid simulation	SD-DES	Rabelo et al. (2007)
Analytical models	Multi criteria decision making	Analytical hierarchy process	Rabelo et al. (2007)
	Systematic models	Life Cycle analysis	Kucukvar et al. (2014)
		Input/ Output Analysis	Albino et al. (2002)
		Performance metrics	Cho et al. (2012)
	Game theory		Cachon et al. (2006)

Order delivery management process is oriented for planning and scheduling problems solving. Half of logistics costs are dedicated for delivering orders to

customers. Such situations requires to find optimal values. Genetic algorithms are used for the situations where the application of traditional techniques is too complicated. The optimisation of order delivery management includes genetic and other metaheuristic algorithms. Many of these are user friendly and their application is important for order routing problem solving.

Returns management process involves reverse orders, physical returns, gate assignment and recycling, which are the main activities in service-oriented circular supply chain. Genetic algorithms are used to overcome complexity. Customer service management the process includes the large amount of data, flow management from factories, suppliers, and warehouses.

These techniques involve mathematical optimisation, where precise algorithms are used to find the best solutions. The genetic algorithms are the oldest and the most used search techniques.

The modelling of customer relationship management process helps analyse the impact on relationships. Metaheuristic algorithms are search techniques used to solve complex problems that are difficult to solve using traditional methods.

The list of meta-heuristic algorithms includes Genetic Algorithms, Evolutionary Algorithms, Differential Evolution Algorithms and Particle Swarm Optimization. The author provides a literature review indicating which of these algorithms are used for the processes mentioned above and how many publications are present.

The more specific overview is provided in Table 3. According to the table, Genetic algorithms are the most widely applied by authors for the return management process.

Evolutionary Algorithms gets the lower number of publications but are present in the research covering all five processes.

Based on the analysis outcome, it is proposed to use metaheuristic methods for revising the researching of service-oriented circular supply chain processes. The literature review of five customers' management processes shows that authors for optimisation analysis of three main supply chain processes mainly use Genetic and Evolutionary algorithms. The application proves that these algorithms are widely applicable; however, other metaheuristic methods are lack of attention.

5. Conclusion

A recent analysis of service-oriented circular supply chain includes some quantitative methods. However, the research potential on the topic of the circular supply chain is quite high. A study of the literature shows that research on mathematics and the natural sciences involves many methods that are not yet applicable in the case of a service-oriented circular supply chain. Also, key algorithms that are widely used to optimise customer management processes and are still not considered in service-oriented circular supply chain research.

Table 3: The application of Meta heuristic methods for customers' management. Source: own research

Methods	Customers' management processes				
	Order management	**Order delivery management**	**Return management**	**Customers' service management**	**Customers' relationship management**
Genetic algorithms (GA)	Kuo 2001; Lawrence & Pasternack 2002; Gao, Xu & Mao 2013; Zhang & Qinghe 2014; Devika, Jafarian, Hassanzadeh & Khodaverdi 2016; Jun & Qing 2015	Liu, Jiang & Geng 2014; Pierre & Zakaria 2014; Mohr 2014; Kumar, Thansekhar, Saravanan & Amali 2014; Zhang & Li 2014; Psychas, Marinaki & Marinakis 2015; Cai, Tang & Yang 2015; Karakatic & Podgorelec 2015; Ahmadizar, Zeynivand & Arkat 2015	Rogers, Lambert, Croxton & Garcı́a-Dastugue 2002; Min, Ko & Ko 2006; Min, Jeongko & Seong 2006; Lieckens & Vandaele 2007; Trappey, Trappey & Wu 2010; Zhou & Min 2011; Diabat, Kannan, Kaliyan & Svetinovic 2013; Li, Guo, Wang & Fu 2013; Boudhar, Dahane & Rezg 2013; Guo & Li 2014; Ghezavati & Nia 2014	Altiparmak, Gen, Lin & Paksoy 2006;	Ngai et al. (2009)
Evolutionary algorithms (EA)	Bandyopadhyay, Saha, Maulik & Deb 2008	Erbao & Mingyong 2009; Tan, Cheong & Goh 2007; Tan, Chew & Lee 2006	Kumar, Kumar, Brady, Garza-Reyes & Simpson 2017	Shen et al. (2005)	Ngai et al. (2009)
Differential evolution algorithms (DE)	Wang, He, Wu & Zeng 2012	Wang & Weise 2010			
Particle swarm optimisation (PSO)	Coello, & Lechuga 2002	Ai & Kachitvichyanukul 2009; Marinakis & Marinaki 2010		Venkatesan et al. (2010)	

In contrast to other topics, the circular supply chain includes a 'waste-free' dimension, which requires more advanced research. Besides, the duration of supply chain processes is important when limited natural resources are considered. Researchers need to emphasise the optimisation of circular supply chain processes. As a result, the author proposes to perform an optimisation analysis to apply the meta-heuristic methods widely used by the authors to optimise various processes. In this study, the author demonstrated the application of a genetic, evolutionary, and other algorithms to optimise five processes, even if the service-oriented circular supply chain includes more processes. A review of the literature on five customer management processes shows that authors are more likely to use genetic algorithms

and evolutionary algorithms in optimisation analysis. The application proves that these two metaheuristic methods are suitable for service-oriented circular supply chain optimisation research.

Further involvement of undivided research is needed, which could respond to the evolution of the supply chain and future possibilities for implementing "waste-free". These studies would react to the European Commission's initiative "Creating a circular economy - Europe without waste" and its implementation.

References

Ahmadizar F, Zeynivand M & Arkat J (2015). Two-level vehicle routing with cross-docking in a three-echelon supply chain: A genetic algorithm approach. *Applied Mathematical Modelling*, 39 (22), 7065–7081

Ai, T. J., & Kachitvichyanukul, V. (2009). Particle swarm optimisation & two solution representations for solving the capacitated vehicle routing problem. *Computers & Industrial Engineering*, 56 (1), 380–387.

Albino, V., Izzo, C., & Kühtz, S. (2002). Input–output models for the analysis of a local/global supply chain. *International journal of production economics*, 78(2), 119-131.

Altiparmak, F., Gen, M., Lin, L., & Paksoy, T. (2006). A genetic algorithm approach for multi-objective optimisation of supply chain networks. *Computers & industrial engineering*, 51(1), 196-215.

Altiparmak, F., Gen, M., Lin, L., & Paksoy, T. (2006). A genetic algorithm approach for multi-objective optimisation of supply chain networks. *Computers & industrial engineering*, 51(1), 196-215.

Anderson Jr, E. G., & Morrice, D. J. (2000). A simulation game for teaching service-oriented supply chain management: does information sharing help managers with service capacity decisions?. *Production and Operations Management*, 9(1), 40-55.

Babu, B. V., & Gujarathi, A. M. (2007, September). Multi-objective differential evolution (MODE) for optimisation of supply chain planning and management. *In 2007 IEEE Congress on Evolutionary Computation* (pp. 2732-2739). IEEE.

Bachlaus, M., Pandey, M. K., Mahajan, C., Shankar, R., & Tiwari, M. K. (2008). Designing an integrated multi-echelon agile supply chain network: a hybrid taguchi-

particle swarm optimisation approach. *Journal of Intelligent Manufacturing*, 19(6), 747.

Bai, C., & Sarkis, J. (2010). Integrating sustainability into supplier selection with grey system and rough set methodologies. *International Journal of Production Economics*, 124(1), 252-264.

Bai, C., & Sarkis, J. (2012). Supply-chain performance-measurement system management using neighbourhood rough sets. *International Journal of Production Research*, 50(9), 2484-2500.

Bandyopadhyay, S., & Bhattacharya, R. (2014). Solving a tri-objective supply chain problem with modified NSGA-II algorithm. *Journal of Manufacturing Systems*, 33(1), 41-50.

Bandyopadhyay, S., Saha, S., Maulik, U., & Deb, K. (2008). A simulated annealing-based multiobjective optimisation algorithm: AMOSA. *IEEE transactions on evolutionary computation*, 12 (3), 269–283.

Boudhar, H., Dahane, M. & Rezg, N. (2013). Spare part returns in stochastic deteriorating manufacturing system under a condition-based maintenance policy: Simulation-based genetic algorithm approach. *Manufacturing Modelling & Management Control*, 7 (1), 1399–1404

Cachon, G. P., & Netessine, S. (2006). Game theory in supply chain analysis. *In Models, methods, and applications for innovative decision making* (pp. 200-233). INFORMS.

Cai, Y. G., Tang, Y. L. & Yang, Q. J. (2015). An improved genetic algorithm for multi-depot heterogeneous vehicle routing problem with simultaneous pickup & delivery time windows. *Applied Mechanical Material,* 738, 361–365

Cho, D. W., Lee, Y. H., Ahn, S. H., & Hwang, M. K. (2012). A framework for measuring the performance of service supply chain management. *Computers & Industrial Engineering*, 62(3), 801-818.

Coello, C. C., & Lechuga, M. S. (2002). MOPSO: A proposal for multiple objective particle swarm optimisation. *In Proceedings of the 2002 Congress on Evolutionary Computation,* 5 (2), 1051–1056. IEEE.

Cui L X 2014 Joint optimisation of production planning and supplier selection incorporating customer flexibility: An improved genetic approach. *Journal Intellectual Manufacturing*. 1–19. doi:10.1007/s10845-014-0932-5

Daniel, J. S. R., & Rajendran, C. (2005). Determination of base-stock levels in a serial supply chain: a simulation-based simulated annealing heuristic. *International Journal of Logistics Systems and Management*, 1(2-3), 149-186.

Devika, K., Jafarian, A., Hassanzadeh, A., & Khodaverdi, R. (2016). Optimising of bullwhip effect & net stock amplification in three-echelon supply chains using evolutionary multi-objective metaheuristics. *Annals of Operations Research*, 242 (2), 457–487.

Diabat, A., Kannan, D., Kaliyan, M. & Svetinovic, D. (2013). An optimisation model for product returns using genetic algorithms & artificial immune system. *Resources, Conservation & Recycling*. 74, 156–169.

Dong, M., & Chen, F. F. (2001). Process modeling and analysis of manufacturing supply chain networks using object-oriented Petri nets. *Robotics and Computer-Integrated Manufacturing*, 17(1-2), 121-129.

Erbao, C., & Mingyong, L. (2009). A hybrid differential evolution algorithm to vehicle routing problem with fuzzy demands. *Journal of computational & applied mathematics*, 231 (1), 302–310.

Gao, L., Xu, K. L. & Mao, D. X. (2013). Research of sales forecasting model & algorithm in food & beverage enterprise. *In: The 19th International Conference on Industrial Engineering & Engineering Management*, 925–934. Berlin: Springer.

Ghezavati, V. & Nia, N. S. (2014). Development of an optimisation model for product returns using genetic algorithms & simulated annealing. *Soft Computer*, 1–15. doi:10.1007/s00500-014-1465-8.

Guo, H. & Li, Y. (2014). Multiobjective location-inventory routing problem taking returns into consideration. *In: Proceedings of the Ninth International Symposium on Linear Drives for Industry Applications*, 2, 19–26. Berlin: Springer 1016.

Hifi, M., & M'Hallah, R. (2009). Beam search and non-linear programming tools for the circular packing problem. *International Journal of Mathematics in Operational Research*, 1 (4), 476-503.

Jun, T. & Qing, W. (2015). Optimise BP neural network structure on car sales forecasts based on genetic algorithm. *In: International Industrial Informatics & Computer Engineering Conference*, 75–79. Atlantis Press.

Karakatic, S. & Podgorelec, V. (2015). A survey of genetic algorithms for solving multi depot vehicle routing problem. *Applied Soft Computer*, 27, 519–532.

Ko, H. J., Ko, C. S. & Kim, T. (2006). A hybrid optimisation/simulation approach for a distribution network design of 3PLS. *Computer Industrial Engineering*, 50 (4), 440–449.

Krikke, H., van Nunen, J. A., Zuidwijk, R., & Kuik, R. (2005). E-business and circular supply chains: increased business opportunities by IT-based customer oriented return-flow management. *In Distribution Logistics* (pp. 221-239). Springer, Berlin, Heidelberg.

Kucukvar, M., Egilmez, G., & Tatari, O. (2014). Evaluating environmental impacts of alternative construction waste management approaches using supply-chain-linked life-cycle analysis. *Waste Management & Research,* 32(6), 500-508.

Kumar, V. S., Thansekhar, M. R., Saravanan, R. & Amali, S. M. J. (2014). Solving multi-objective vehicle routing problem with time windows by FAGA. *Proceedings Engineering,* 97, 2176–2185.

Kuo, R. J. (2001). A sales forecasting system based on fuzzy neural network with initial weights generated by genetic algorithm. *European Journal of Operational Research*, 129 (3), 496–517.

Kuo, R. J., & Han, Y. S. (2011). A hybrid of genetic algorithm and particle swarm optimisation for solving bi-level linear programming problem–A case study on supply chain model. *Applied Mathematical Modelling*, 35(8), 3905-3917.

Kuo, R. J., Wang, Y. C., & Tien, F. C. (2010). Integration of artificial neural network and MADA methods for green supplier selection. *Journal of cleaner production*, 18(12), 1161-1170.

Kwon, O., Im, G. P., & Lee, K. C. (2007). MACE-SCM: A multi-agent and case-based reasoning collaboration mechanism for supply chain management under supply and demand uncertainties. *Expert Systems with Applications*, 33(3), 690-705.

Langer M, Loidl S and Nerb M 1999 Customer service management: Towards a management information base for an IP connectivity service. *In: The Fourth IEEE Symposium on Computers and Communications*, Red Sea, Egypt, pp. 149–155

Lawrence, J. A. & Pasternack, B. A. (2002). Applied management science: Modelling, spreadsheet analysis, & communication for decision making, 2nd. New Jersey: Wiley

Lee, D. H., Chen, J. H., & Cao, J. X. (2010). The continuous berth allocation problem: A greedy randomised adaptive search solution. *Transportation Research Part E: Logistics and Transportation Review*, 46(6), 1017-1029.

Lee, L. H., Chew, E. P., Teng, S., & Chen, Y. (2008). Multi-objective simulation-based evolutionary algorithm for an aircraft spare parts allocation problem. *European Journal of Operational Research*, 189 (2), 476-491.

Li, Y., Guo, H., Wang, L. & Fu, J. (2013). A hybrid genetic simulated annealing algorithm for the location-inventory routing problem considering returns under E-supply chain environment. *Science World Journal*, 125–143. doi:10.1155/2013/125893

Lieckens, K. & Vandaele, N. (2007). Reverse logistics network design with stochastic lead times. *Computer Operational Research,* 34 (2), 395–416.

Liu, R., Jiang, Z & Geng, N. (2014). A hybrid genetic algorithm for the multi-depot open vehicle routing problem. *OR Spectrum*, 36 (2), 401–421.

Min, H., Ko, C. S., & Ko, H. J. (2008). Managing product returns in customer-centric e-tail environments. *International Journal of Services Technology and Management*, 9(1), 51-70.

Mohr, C. M. (2014). Optimisation of warehouse order-picking routes using vehicle routing model & genetic algorithm. *Doctoral dissertation*, State University of New York at Binghamton.

Ngai, E. W., Xiu, L., & Chau, D. C. (2009). Application of data mining techniques in customer relationship management: A literature review and classification. *Expert systems with applications*, 36(2), 2592-2602.

Ojha, R., Ghadge, A., Tiwari, M. K., & Bititci, U. S. (2018). Bayesian network modelling for supply chain risk propagation. *International Journal of Production Research*, 56(17), 5795-5819.

Ossipov P 2005 Heuristic optimisation of sequence of customer orders. *Applied Mathematical Computation* 162(3): 1303–1313

Pierre, D. M. & Zakaria, N. (2014). Partially optimised cyclic shift crossover for multi-objective genetic algorithms for the multi-objective vehicle routing problem with timewindows. *In: 2014 IEEE Symposium on Computational Intelligence in Multi-Criteria Decision-Making*, 106–115.

Psychas, I. D., Marinaki, M. & Marinakis, Y. (2015). A parallel multi-start NSGA II algorithm for multiobjective energy reduction vehicle routing problem. *In: International Conference on Evolutionary Multi-Criterion Optimization*, 336–350. Springer International Publishing. doi:10. 1007/978-3-319-15934-8_23

Raghavan, N. S., & Viswanadham, N. (1999, December). Performance analysis of supply chain networks using Petri nets. *In Proceedings of the 38th IEEE Conference on Decision and Control* (Cat. No. 99CH36304) (Vol. 1, pp. 57-62). IEEE.

Rasti-Barzoki, M., & Hejazi, S. R. (2015). Pseudo-polynomial dynamic programming for an integrated due date assignment, resource allocation, production, and distribution scheduling model in supply chain scheduling. *Applied Mathematical Modelling*, 39(12), 3280-3289.

Robert S 1991 Computer aided marketing and selling. *In: Butterworth Heinemann* ISBN 978-0-7506-1707-9

Rogers D. S., Lambert, D. M., Croxton, K. L. & Garcı´a-Dastugue, S. J. (2002). The returns management process. *International Journal Logistics Management*, 13 (2), 1–18.

Samuel, C., Gonapa, K., Chaudhary, P. K., & Mishra, A. (2010). Supply chain dynamics in healthcare services. *International journal of health care quality assurance*.

Schmitt, A. J., & Singh, M. (2009, December). Quantifying supply chain disruption risk using Monte Carlo and discrete-event simulation. *In Proceedings of the 2009 winter simulation conference* (WSC) (pp. 1237-1248). IEEE.

Selim, H., & Ozkarahan, I. (2008). A supply chain distribution network design model: an interactive fuzzy goal programming-based solution approach. *The International Journal of Advanced Manufacturing Technology*, 36(3-4), 401-418.

Shen, Z. J. M., & Daskin, M. S. (2005). Trade-offs between customer service and cost in integrated supply chain design. *Manufacturing & service operations management*, 7(3), 188-207.

Sidola, A., Kumar, P., & Kumar, D. (2011, June). System dynamic methodological approach for design and analysis of risk in supply chain. *In First International Technology Management Conference* (pp. 495-500). IEEE.

Silva, C. A., Sousa, J. M. C., Runkler, T. A., & Da Costa, J. S. (2009). Distributed supply chain management using ant colony optimisation. *European Journal of Operational Research*, 199(2), 349-358.

Tan, K. C., Cheong, C. Y., & Goh, C. K. (2007). Solving multiobjective vehicle routing problem with stochastic demand via evolutionary computation. *European Journal of operational research*, 177 (2), 813–839.

Tan, K. C., Chew, Y. H., & Lee, L. H. (2006). A hybrid multiobjective evolutionary algorithm for solving vehicle routing problem with time windows. *Computational Optimization & Applications*, 34 (1), 115.

Trappey, A. J., Trappey, C. V. & Wu, C. R. (2010). Genetic algorithm dynamic performance evaluation for RFID reverse logistic management. *Expert Systems Applied,* 37 (11), 7329–7335.

Venkatesan, S. P., & Kumanan, S. (2010). Bi-criteria allocation of customers to warehouses using a particle swarm optimisation. *International Journal of Operational Research*, 9(1), 65-81.

Vergara, F. E., Khouja, M., Michalewicz, Z. (2002). An evolutionary algorithm for optimising material flow in supply chains. *Computers & Industrial Engineering*, 43 (3), 407 – 421.

Wang, G., Hu, X., Li, X., Zhang, Y., Feng, S., & Yang, A. (2020). Multiobjective decisions for provider selection and order allocation considering the position of the CODP in a logistics service supply chain. *Computers & Industrial Engineering*, 140, 106216.

Wang, Y., Li, B., & Weise, T. (2010). Estimation of distribution & differential evolution cooperation for large scale economic load dispatch optimisation of power systems. *Information Sciences*, 180 (12), 2405–2420.

Wang, L., He, J., Wu, D., & Zeng, Y. R. (2012). A novel differential evolution algorithm for joint replenishment problem under interdependence & its application. *International Journal of Production Economics*, 135 (1), 190–198.

Zhang, J. & Li, J. (2014). A hybrid genetic algorithm to the vehicle routing problem with fuzzy cost coefficients. *In: 2014 IEEE 11th International Conference on Fuzzy Systems & Knowledge Discovery*, 147–152.

Zhang, S. & Qinghe, H. (2014). Application of GA optimising neural network to coal sales forecasts. *In: 2nd International Conference on Information, Electronics & Computer. Atlantis Press*.

Zhou G, Min H and Gen M 2002 The balanced allocation of customers to multiple distribution centers in the supply chain network: A genetic algorithm approach. *Comput. Ind. Eng*. 43(1–2), 251–261

Zhou G, Min H and Gen M 2003 A genetic algorithm approach to the bi-criteria allocation of customers to warehouses. *International Journal Production Economics* 86(1): 35–45

Zhou, G. & Min, H. (2011). Designing a closed-loop supply chain with stochastic product returns: A Genetic Algorithm approach. *International Journal Logistics Systems Management*, 9 (4), 397–418.

Zhou, W., Zhang, R., & Zhou, Y. (2013). A queuing model on supply chain with the form postponement strategy. *Computers & Industrial Engineering*, 66(4), 643-652.