

Simulation-based solution approach for resilient supply chain network design for retail supply chains

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The design of the supply chain network consists of making strategic decisions on the facility location, stocking location, production policy, production capacity, distribution, and transportation modes. This study models various resilient conditions with respect to design of the retail, supply chain network. According to literature, supply network design and redesign play a major role in cutting costs and creating efficient supply chain networks. However, there has been low level of consideration given to factors such as supply chain resiliency and reverse logistics. This study has been conceptualised to include the effects of these issues in the network design and optimise the design so that the solution would be able to withstand the volatility and the uncertainty in the present business environment. The main objective of this study would be to model resilience into the design of the supply chain network with the use of *Supply Chain Guru*[®] modelling and simulation tool. The modelling considerations will include parameters for location, demand and supply, and consist of a typical non-perishable retail good, rice, supply chain. The network will consist of collecting points and milling stations as tiers of suppliers and regional distribution centres and distribution centres as distribution locations. Collection points in upper stream of the chain will collect the harvest from nearby farmers and will send to the milling stations. Regional distribution centres will collect products from mills and distribute them to distribution centres scattered around the area, which will then be in charge of filling the stocks of retail outlets in each of its surrounding. The study consists of scenarios depicting environmental and other kinds of disruptions in various stages of the network, preventing it from operating in routine form. Hence, in the conclusion of the study, it proposes an optimal network design to suit each scenario, building the resilient design, which can be used to fulfil the demand requirement of each distribution centre. This can also be used to identify the nodes that are critical and the nodes that can withstand disruptions, making it easier for effective decision making.

Keywords: Resilient supply chains, Retail, Simulation based optimisation, Supply chain network design

Acknowledgement: Financial support for computational resources by the Research Council of the University of Kelaniya, grant number: RP/03/SR/02/02/01/2016 and the Research Service Centre of the Faculty of Science, University of Kelaniya.