# Editorial

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## 1 Introduction

Over the past decades, inventory management has become a well-studied area from economic point of view. An inventory management system as an undeniable part of logistics operations supervises the flow of goods from manufacturers to warehouses and from these facilities to the point of sale. All these activities may harm the environment and/or society, and therefore creating a sustainable view in inventory management is an essential function. While inventory systems are optimised to reduce costs, the social and environmental impacts of inventory systems are ignored. However, in the recent years, a growing pressure from customers as well as governments leads inventory systems to address sustainability issues. Raising public concerns regarding environment have influenced the logistical planning and operations significantly. Both 'consumer environmental awareness' (CEA) and 'consumer social awareness' (CSA) force the inventory systems to be more and more sustainable. In fact, being more sustainable is a crucial issue in nowadays' inventory systems. Optimising an inventory system by considering the triple bottom line (TBL) (i.e., financial, environmental, and social) is a challenge from both academic and applied point of views.

This special issue aims to discover recent advances in various aspects of sustainability in inventory management from both theoretical and applied points of view. All of the results provide great insights to sustainable development of inventory systems for both scholars and industrialists.

## 2 Inventory insights

This special issue of *IJIR* includes four research papers in sustainable inventory management. The findings and insights generated by them are summarised in the following.

'Closed-loop supply chain simulation with disruption considerations: a case-study on Tesla', by Gianesello, Ivanov, and Battini, analyses the resilience of the reverse logistics in a real case. The authors argue that the resiliency of reverse logistics, which is tightly interrelated with the sustainable inventory management and supply chain sustainability in general, is rarely investigated by previous studies. They study the impact of disruptions in the reverse part of an automotive closed-loop supply chain. The authors, using a

discrete-event simulation methodology, study the impact of disruptions on six-echelon closed-loop supply chain of Tesla Motors Co. in German market. The company designs, develops, manufactures and sells electric vehicles and energy storage products through an international network which comprises over 350 suppliers and different facilities scattered around the world. The results of this study illustrate that disruptions in the reverse supply chain may affect the financial and operational performances of the company significantly. In addition, in this study, recovery policies are also simulated to examine the solutions to recover the company and restore its operations and performance.

In 'Dynamic pricing and profit maximisation: a simulation based approach for agri-fresh products retailing in India', Sabir and Farooquie, by collecting primary data from 89 Indian retailers, create a decision model for planning markdowns for 'not so fresh' agri-food products. As the demand of agri-food products like fruits and vegetables (F&V) depends on price and promotional activities such as mark downs, it is a critical decision for agri-food retailers to decide markdown amounts based on remaining shelf life of products. Inventory management in agri-fresh products directly influences general level of society health and can help to eliminate hunger, food insecurity and malnutrition. Sabir and Farooquie, using a simulation approach, analyse the inventory systems of agri-food products to find optimal time and amount of markdowns in order to maximise the retailer's profit and satisfy buyers. The results of simulation study show that optimisation of timing and amounts of markdowns have a great impact on profitability of F&V retailers.

'Single-vendor multi-buyer game theoretic model under multi-factor dependent demand', by Guchhait, Sarkar, Sarkar, and Pareek discusses an inventory model in a two-stage supply chain with multiple buyers where demand is dependent on price and advertisement level. Purchasing price of buyers in the investigated model is assumed to be a linear descending function of defective rate. A screening stage is conducted by buyers to identify defective products and sent back them to the vendor. Vendor sells out defective products after reworking. Reworking and refurbishing requires less natural resources compared to producing new products and in many cases generate less emissions and therefore results in a more sustainable operations. In this regard, the proposed model contributes in creating sustainable inventory systems. In this model, supply chain members decide on order quantity, selling price, and advertisement costs. Both decentralised and centralised decision making in the investigated supply chain are analysed. Under decentralised modelling, both buyer-led and vendor-led Stackelberg models are examined. It is found that under the assumed conditions, cooperation between members creates a significant improvement for the total chain.

In 'Deterministic inventory model for items with linear demand, variable deterioration and partial backlogging', Srivastava and Singh presents a mathematical approach for studying a deterministic inventory model for a deteriorating item with a linear demand and variable deterioration rate. This study pursues to optimise order quantity and the length of the ordering cycle. Variable deterioration rate can be seen in products like fruits, vegetables, meat, fish, dairy products whose rate of deterioration increases with time. Since these items have direct influence on public health, and at the same time availability of food is one of fundamental human needs, therefore developing an inventory optimisation model for this type of products can help to meet the

requirements of sustainable development. The results from this study show that by optimised decision making on order quantity and ordering cycle, it is possible to reduce the inventory related costs significantly.

The papers in this special issue provide a great insight toward creating sustainable inventory systems. Guest editors of this special issue appreciate all the researchers who submit their works, contributors, and reviewers for their great contributions in creating more insights toward sustainability.