

# Perspectives on Supply Chain Coordination through Vendor Managed Inventory

---

Prof. Ashis K. Chatterjee (Chair)

Prof. Subrata Mitra

Prof. Anup Sen



interests were analyzed. Analysis suggested that more cost efficient buyers would prefer an operating cost constraint (which limits the total service related payment to the supplier), while less cost efficient buyers would prefer a net profit constraint (which protects their profits post VMI implementation).

Subsequently, I focus on the role of demand enhancing effects like national level advertising by the supplier and sales effort by the retailers on the profitability of the SC under the assumption of supplier Stackelberg leadership. It is shown that changes in market related parameters had a significant influence on the performance of the system. It was also observed that the pricing decisions were less sensitive to changes in production related parameters. However, changes in these parameters could significantly influence the inventory policy. The impact of coupling together asymmetric parties into a common system as well as the effect of the presence of a relatively stronger retailer in the system was also explored.

The benefit of integrated production, inventory, transportation and emission related decision making is analyzed next. The model developed incorporated the environmental policy parameters like emission tax and emission upper limit to arrive at optimized mode of operation. It is shown that using VMI enabled SC coordination, businesses can reap economic rewards, and at the same time they can reduce their greenhouse gas emissions. Implications for policy makers have also been discussed.

Lastly, I developed an approximate model to determine the optimal replenishment policy of a single vendor multiple buyer VMI system under stochastic demand. In order to establish the validity of the results obtained using the said approximation, a detailed simulation study was carried out. Levers available to the parties to control or monitor the arrangement were also

analyzed. The factors that, in the long run, would help in making the mechanism successful have been highlighted.

In essence, my work highlights the need to explore the myriad options available to achieve SC coordination through VMI, and adopt the one that can help all the members involved in establishing a sustainable mutually beneficial relationship.