

Hybrid Inventory Model Optimization under Uncertainties: A Case Study in a Manufacturing Plant

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Abstract : Periodic and continuous inventory models are the two classical management tools used to handle inventories. These models have advantages and disadvantages. The implementation of both continuous (r,Q) inventory and periodic (R, S) inventory models in most manufacturing plants comes with higher cost. Such high inventory costs are due to the fact that most manufacturing plants are not flexible enough. Since demand and lead-time are two important variables of every inventory models, their effect on the flexibility of the manufacturing plant matter most. Unfortunately, these effects are not clearly understood by managers. The reason is that the decision parameters of the continuous (r, Q) inventory and periodic (R, S) inventory models are not designed to effectively deal with the issues of uncertainties such as poor manufacturing performances, delivery performance supplies performances. There is, therefore, a need to come up with a predictive and hybrid inventory model that can combine in some sense the feature of the aforementioned inventory models. A linear combination technique is used to hybridize both continuous (r, Q) inventory and periodic (R, S) inventory models. The behavior of such hybrid inventory model is described by a differential equation and then optimized. From the results obtained after simulation, the continuous (r, Q) inventory model is more effective than the periodic (R, S) inventory models in the short run, but this difference changes as time goes by. Because the hybrid inventory model is more cost effective than the continuous (r,Q) inventory and periodic (R, S) inventory models in long run, it should be implemented for strategic decisions.

Keywords : periodic inventory, continuous inventory, hybrid inventory, optimization, manufacturing plant

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