

Empirical Investigation of Bullwhip Effect with Sensitivity Analysis in Supply Chain

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Abstract : The main purpose of this research is to the empirical investigation of the bullwhip effect under sensitivity analysis in the two-tier supply chain. The simulation modeling technique has been applied in this research as a research methodology to see the sensitivity analysis of the bullwhip effect in the rice industry of Pakistan. The research comprises two case studies that have been chosen as a sample. The results of this research have confirmed that reduction in production delay reduces the bullwhip effect, which conforms to the time compressing paradigm and the significance of the reduction in production delay to lessen demand amplification. The result of this research also indicates that by increasing the value of time to adjust inventory decreases the bullwhip effect. Furthermore, by decreasing the value of alpha increases the damping effect of the exponential smoother, it is not surprising that it also reduces the bullwhip effect. Moreover, by reducing the value of time to work in progress also reduces the bullwhip effect. This research will help practitioners and operation managers to reduces the major costs of their products in three ways. They can reduce their i) inventory levels, ii) better utilize their capacity and iii) improve their forecasting techniques. However, this study is based on two tier supply chain, while in reality the supply chain has got many tiers. Hence, future work will be extended across more than two-tier supply chains.

Keywords : bullwhip effect, rice industry, supply chain dynamics, simulation, sensitivity analysis

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