



Variability and Supply Chain

Supply Chain Management is managing uncertainty in the Supply Chain.

According to a recent survey by the Forrester Group, high variability in demand and supply were among the top three impediments to improvement in supply chain performance. The other two reasons cited were process inefficiencies and immature technology.

Supply Chain Variability can be caused due to

1. Lack of **information sharing and visibility** in the supply chain
2. Lack of supply chain **coordination and integration**
3. Inability to **adapt to events in real time**
4. Inability to fully **comprehend the immediate and future impact of planned actions**
5. **Sub-optimal processes** or **local optimization** of parts of the supply chain
6. **Poor planning**
7. Lack of **process and quality control**
8. **Unexpected delays** in the supply process

Bullwhip effect and **Snowball effect** are two classic examples of the result of Supply Chain Variability.

Bullwhip Effect

Variability in order sizes grows as demand signals propagate upstream in the supply chain. For example, in a study conducted some years ago, P&G found puzzling, dramatic fluctuations in retailers' orders to wholesalers for its diapers, even though there was a steady rate of consumption of the diapers by babies (end customers). Even wilder were the fluctuations in orders that P&G was receiving from the wholesalers.



Information in the Electronics Supply Chain

Typically, **each member of the supply chain sees only the orders from its customers**, and those orders are usually based on the customer's forecasts, rather than the customer's actual sales. Then the supplier must forecast in turn for its operations and suppliers. Forecasts, which always have error, are thus based on other forecasts and the errors compound. [Read More...](#)

Related Resources

- [The Bullwhip Effect](#)
- [Ups and downs of SCM](#)
- [The Last Crack of the Bullwhip](#)



Snowball Effect

Variability in supply quantities and supply delays increase as one moves downstream in the supply chain. For example, a small breakdown in a machine in a thread manufacturing plant in India can cause a four-day delivery delay to the Knitter in Malaysia, which can result in a seven-day delivery delay to the Dyer in Hong Kong and finally snowball into a 10-day delivery delay of a hot, new model to the clothing manufacturer in Europe, resulting in loss of sales worth millions of dollars.

Specifically, these effects can result due to **isolated forecasting** (demand forecasts updated based on orders rather than customer demand), **fixed costs and economies of scale** encouraging large orders, **hockey stick sales patterns (bulk of sales taking place at the end of month)**, **price promotions, forward buying, overstocking at month/year end** to meet targets, **rationing and gaming shortage** (scarce supplies allocated in proportion to requested quantities rather than the ability to sell) etc.

Effect of variability on Supply Chain Performance

1. Large demand and supply fluctuations result in the need for high inventories to prevent stockouts
2. Poor customer service as all demand might not be met
3. Production scheduling and capacity planning becomes difficult due to large order swings
4. Extra plant expansion to meet peak demand
5. High costs for corrections - large unexpected orders or supply problems necessitate expedited shipments and overtime
6. Conflict between supply chain players

Some of the **critical areas** that can be looked at to reduce the impact of variability on the supply chain include **aligning incentives to overall supply chain performance objectives**; **developing trust and contractual agreements** between supply chain partners; approaches such as delayed **differentiation, designing for commonality; direct sales, vendor managed inventory, continuous replenishment; multi-echelon inventory control policies; lead time reduction** through operational efficiency and design; **lot size reduction** using efficient transportation and distribution systems; **price stabilization** and **uniform pricing**.

Next issue: [Unfolding Forecasting](#)
Previous issue: [Supply Chain Simulation](#)

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