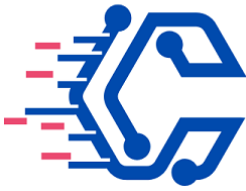


Managing Trade-offs to build a resilient Supply Chain

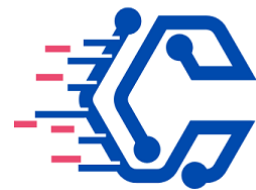


A summary of key points from the longer article here: <https://scorizons.com/build-supply-chain-resilience/>

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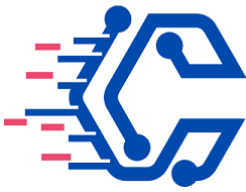




The value of Supply Chain resilience

- Supply Chain resilience is the capability a company has, to prevent major supply chain disruptions and to mitigate the impact of the ones that do occur.
- In his books, Nassim Nicholas Taleb posits that the impact of extremely rare “Black Swan” events on the world, our lives and the course of history completely dwarfs the impact of anything we do during “normal” times.
- This is validated by a Boston Consulting Group (BCG) study that found that resilient companies (15% of the companies in the study group) financially outperformed their industry peers by an average of 5 percentage points over the course of the 25-year study.

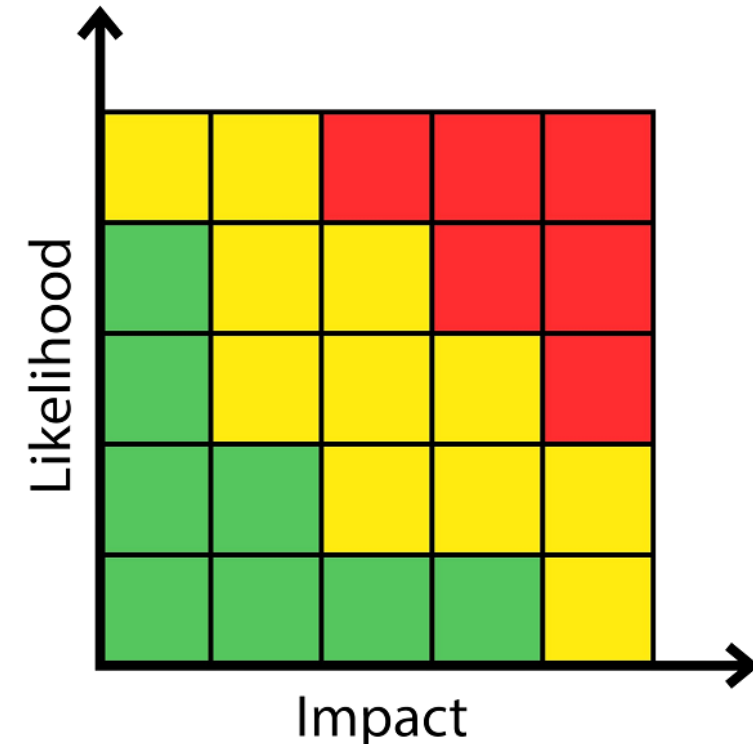




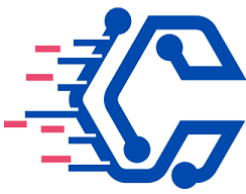
Time to market and Cost of Goods Sold

- Within the tight deadlines of the product development process, and the constant tussle between engineers and sourcing managers on the topics of specifications, quality and cost, considerations of **risk and resilience** are often missed.
- Qualification of alternative suppliers and consideration of risk scenarios often happens only after the product has been launched, when it's too late to make a substantial impact. At this point, you're already locked-in to a significant extent, and have limited ability to influence the supply chain.
- The solution is fairly obvious, though not easy to implement – **Incorporate Supply Chain risk management into the Product Development process.**
- What's needed, is to expand the definition of “failure modes” at the product development stage to include not just the technical failure of the product itself, but also failure to deliver the product to the customer.

Risk Matrix



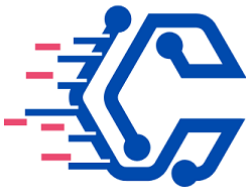
Risk management methodology, Lean and a culture of resilience



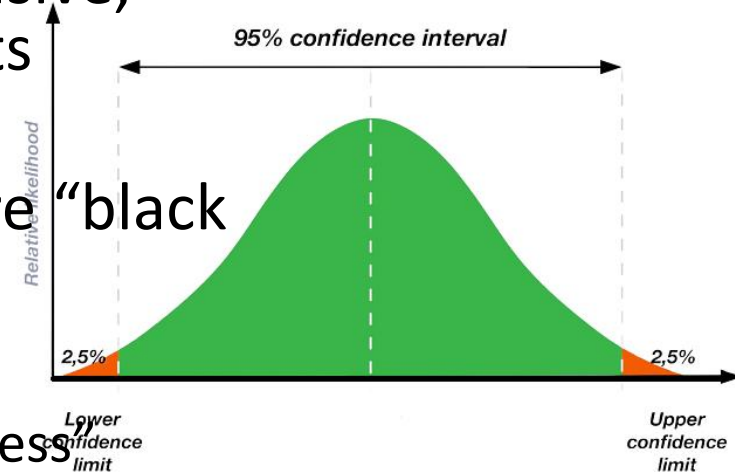
- While Black Swan events have a disproportionately high “impact” score in a risk matrix, their inherently low probability of occurrence typically gives them a lower risk score, and hence a low priority.
- However, as Taleb and BCG, among others, have shown, the failure to build resilience to potential Black Swan events can result in companies financially underperforming their peers not just during the crisis, but over the long term.
- The answer is to build a culture of resilience and consider robustness to extreme events based on universal, common-sense principles, such as building “factors of safety” into everything, without reference to specific Black Swan events or their risk score.
- Factors of safety imply excess that’s not immediately needed, which can conflict with Lean principles that have come to be widely adopted.
- A culture of resilience demands a more pragmatic approach to Lean, where factors of safety essential to ensuring long-term longevity of a business are excluded from the criteria of “waste” in Lean.

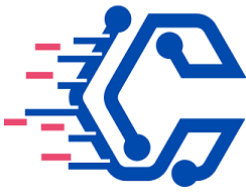


95% confidence intervals, safety stock and strategic stock



- Safety stock calculations typically use 95% service levels as target, risking stockouts 5% of the time.
- 95% target service levels are used because of the “long-tail effect” – Targeting service levels higher than 95% is increasingly expensive, and unjustified by the benefits gained in eliminating stockouts completely.
- By implication, safety stock doesn’t provide robustness to rare “black swan” events.
- Two approaches to getting around this are:
 - Strategic Stock: Maintain a permanent inventory of “critical to business” items, the amount of inventory being determined by the time to recover from extreme events, rather than demand or lead time variability.
 - Tiered Safety stock: While targeting an overall service level of 95% in safety stock policy, identify critical to business items for a 98% or higher service level, while less critical items have a target service level below 95%.





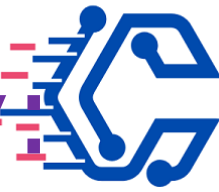
Economies of scale and complexity

- A modular, globally dispersed Supply Chain provides economies of scale – a manufacturer of headlights who supplies headlights to many car manufacturers can produce headlights for cheaper than a car manufacturer that manufactures its own headlights.
- A modular supply chain design also provides some resilience, by reducing dependence on any single location or source of supply.
- However, once we've mitigated the basic risk of overdependence on a single factory, a single supplier, a single location etc., further complexity in the supply chain adds risk and reduces resilience, instead of increasing it.
- Hence needless complexity must be avoided in supply chain design, minimizing the number of nodes, supply chain tiers and middlemen in the supply chain
- A global supply chain governance process that includes auditing suppliers on resilience criteria is essential to a resilient supply chain design.



Business cycles and Structural complexity

The double helix



- The extent of vertical integration in the supply chain plays a crucial role in supply chain resilience, with the most resilience supply chain architecture being midway between completely modular and completely integral.
- However, the extent of vertical integration is often determined by business cycles beyond the control of supply chain managers.
- One such cycle is the “double helix” described by Prof. Charles Fine in his book “Clockspeed” – organizational rigidities and loss of focus cause pressure to disintegrate, while loss of control causes pressure to integrate.
- Another cycle is set up by Black Swan events themselves – After extreme events, companies seek greater control over their supply chains, causing greater integration, but subsequent higher costs cause pressure to disintegrate.
- Awareness of these cycles and making supply chain decisions with them in mind can, by itself, lead to a more resilient supply chain design.

