Supply Chain Risk Management (SCRM)

Managing risk in global supply chain networks

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Introduction

Thailand's floods in 2011 (Haraguchi and Lall 2015)

- The impact of the prolonged floods on the world and the Thailand economy was devastating.
- United Nations Office for Disaster Risk Reduction (UNISDR) estimated that Thailand's 2011 flood reduced the world's industrial production by 2.5%.
- The World Bank estimated that the real GDP growth rate in 2011 declined from 4.1% (expected) to 2.9%.
- The impact of the flooding in Thailand was obviously reflected in the insured damage, which has been assessed $10 billion

Introduction

Case study of Thailand's floods in 2011 (Haraguchi and Lall 2015)

- In the beginning of 2012, Western Digital's earnings decreased 35%,up to 145 million dollars, while Seagate increased its profit from 150 million dollars to 563 million dollars.

- This is primarily because Western Digital's factories were in the flood zones, while Seagate was mainly affected through their supply chain.

- As a consequence, Seagate recaptured the top position in hard disk drive shipments during the fourth quarter of 2011, since it only declined 8% compared to third-quarter figures of 50.8 million units.

- Western Digital's shipment, on the other hand, declined significantly by 51%, from 57.8 million units in the previous quarter.

Introduction

Damages to major HDD makers.
Source: Press release.

Company	Place of factories	Damage	State of operation /production
Western Digital	1) Bang Pa-in Industrial Estate 2) Nava Nakorn Industrial Estate	Factories were inundated (2 m)	- Stopped production since Oct 16, 2011 - Partly restored on Nov 30, 2011 - Needed days to restore:46 days
Toshiba	Nava Nakorn Industrial Estate	Factory was inundated (1 m)	- Stopped production since Oct 11, 2011 - Alternate production in Philippines - Partly restored Thai factory on Feb 1, 2012 - Needed days to restore: 114 days
Seagate Technology	1) Seagate Teparuk, Amphur Muang, Samutprakarn Province 2) Seagate Korat, Amphur Sungnoen, Nakhon-Ratchasima	Factories were not inundated	- Some adjusted production due to the lack of supply from suppliers
Samsung	In South Korea	Factories were not inundated	- Some adjusted production due to the lack of supply from suppliers

Source: (Haraguchi and Lall 2015)

Introduction

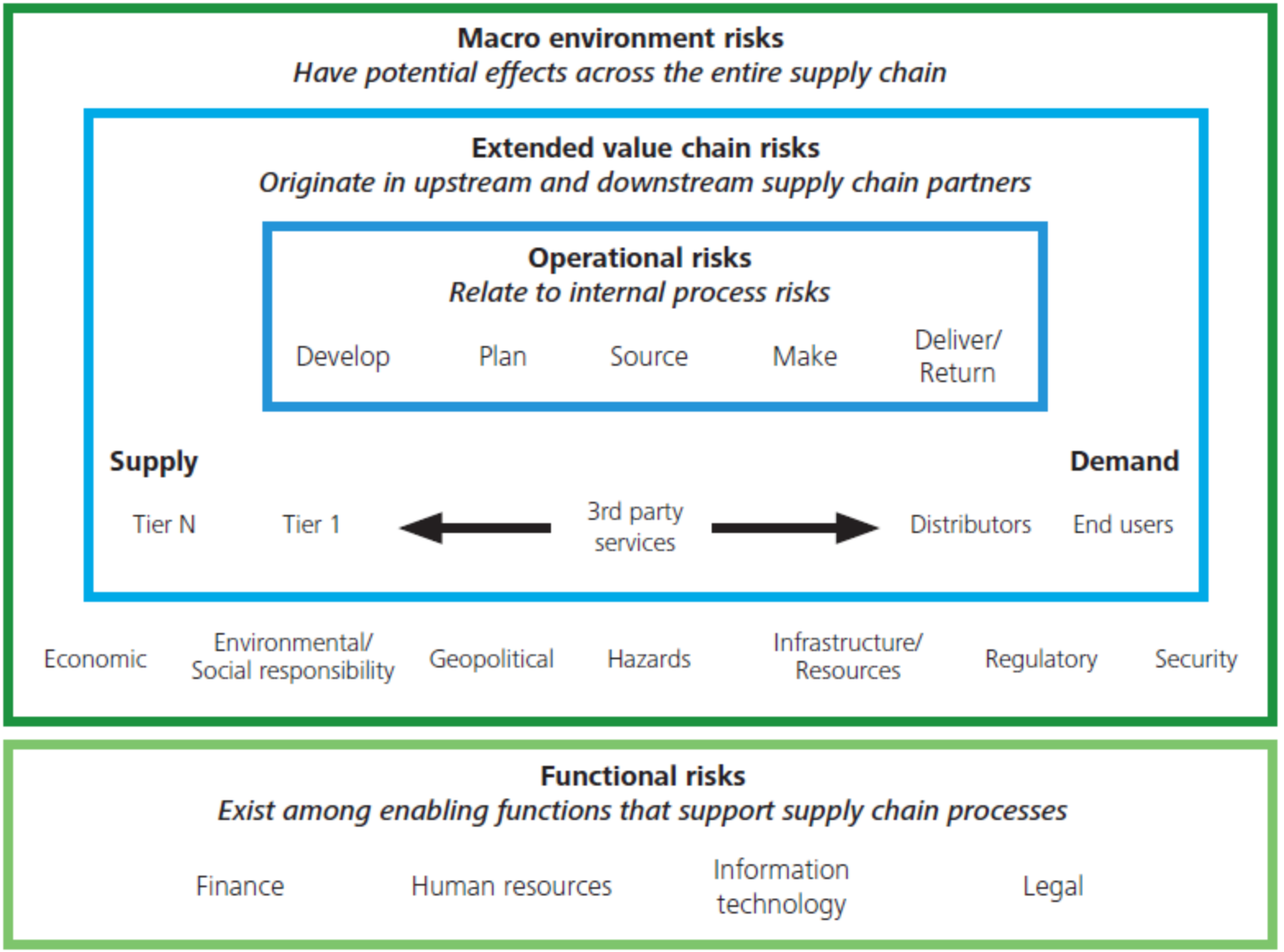
Research program carried out by the Global Supply Chain Institute at the University of Tennessee, College of Business Administration (2014).

The research team distributed a questionnaire across a wide range of companies, including retailers, manufacturers and service providers (150 different supply chain executives).

Supply Chain Risk Ratings:

1. Quality problems (Whirlpool)
2. Increased inventory due to a longer global supply chain (inventory turnover goals)
3. Natural disasters
4. Other (business continuity)

Risk in global supply chain networks



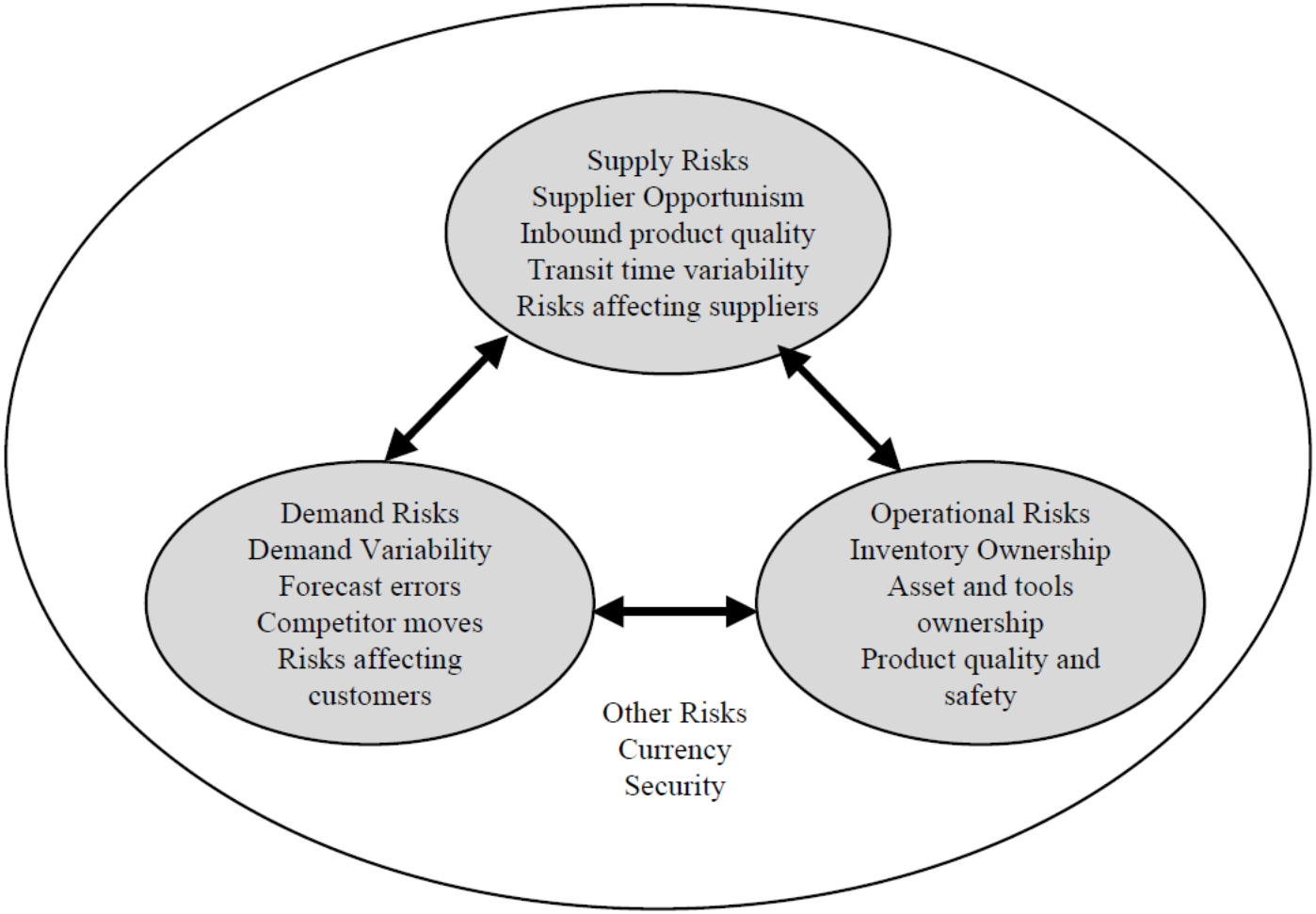
Risk in global supply chain networks

- Different risk events in global supply chains are linked to each other in complex patterns with one risk leading to another, or influencing the outcome of other risks.

- Although such inter-linkages are also present in domestic supply chains, their unpredictability and impact increases in global supply chains.

- Challenges of determining optimal order quantities, optimal production quantities, safety stock levels, and other inventory policies that significantly affect global supply chain performance both in terms of costs and profitability.

Risk in global supply chain networks



Managing risk in global supply chain networks

Strategies for managing risk in global supply chain networks (Manuj and Mentzer 2008):

- Postponement
- Speculation
- Demand management
- Hedging
- Control/Share/Transfer
- Security
- Avoidance
- Insurance

Managing risk in global supply chain networks: postponement

- Postponement entails delaying the actual commitment of resources to maintain flexibility and delay incurring costs.
- Form postponement includes labeling, packaging, assembly and manufacturing. Time postponement refers to the movement of goods from manufacturing plants only after customer orders are received.
- The extent of form postponement depends on demand customization, component costs, product life cycle and product modularity.
- Form postponement requires a substantial investment in understanding product design.
- Since global supply chains face high risks, postponement becomes increasingly valuable as the proportion of off-shore components in the final product increases.

Managing risk in global supply chain networks: postponement

Postponement is defined as a strategy that intentionally delays the execution of a task, instead of starting it with incomplete or unreliable information input.

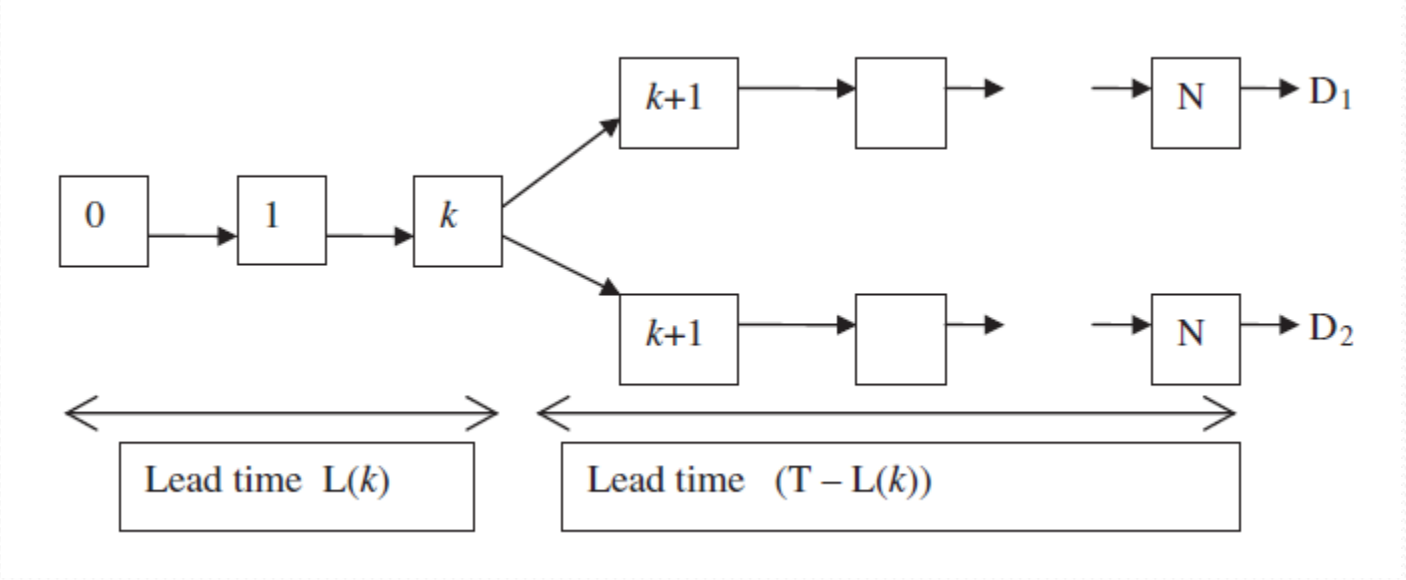
The aim of postponement is to increase the efficiency of the supply chain by moving product differentiation (at the decoupling point) closer to the end user.

Postponing the decoupling point reduces the risk of being out of stock for long periods at the retailer and of holding too much stock of products that are not required.

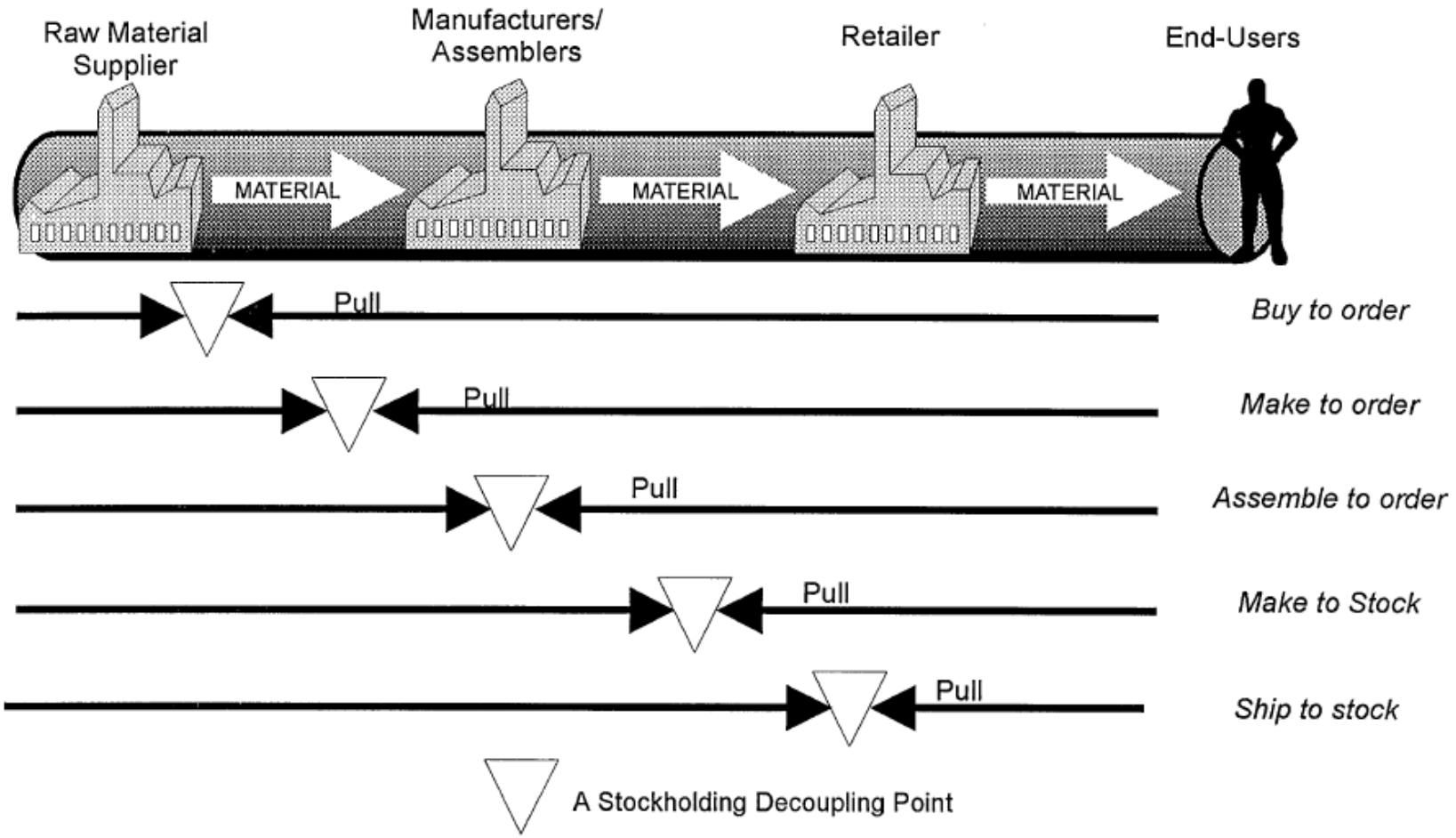
The well-known Benetton example demonstrates the use of postponement in the fashion trade. Benetton delayed the dyeing of their jumpers, which is the point at which the jumpers are differentiated, until the end of the process. Postponement is also essential where products have, or are likely to have, a short life cycle as in the Benetton example or for PC manufacturers.

Managing risk in global supply chain networks: postponement

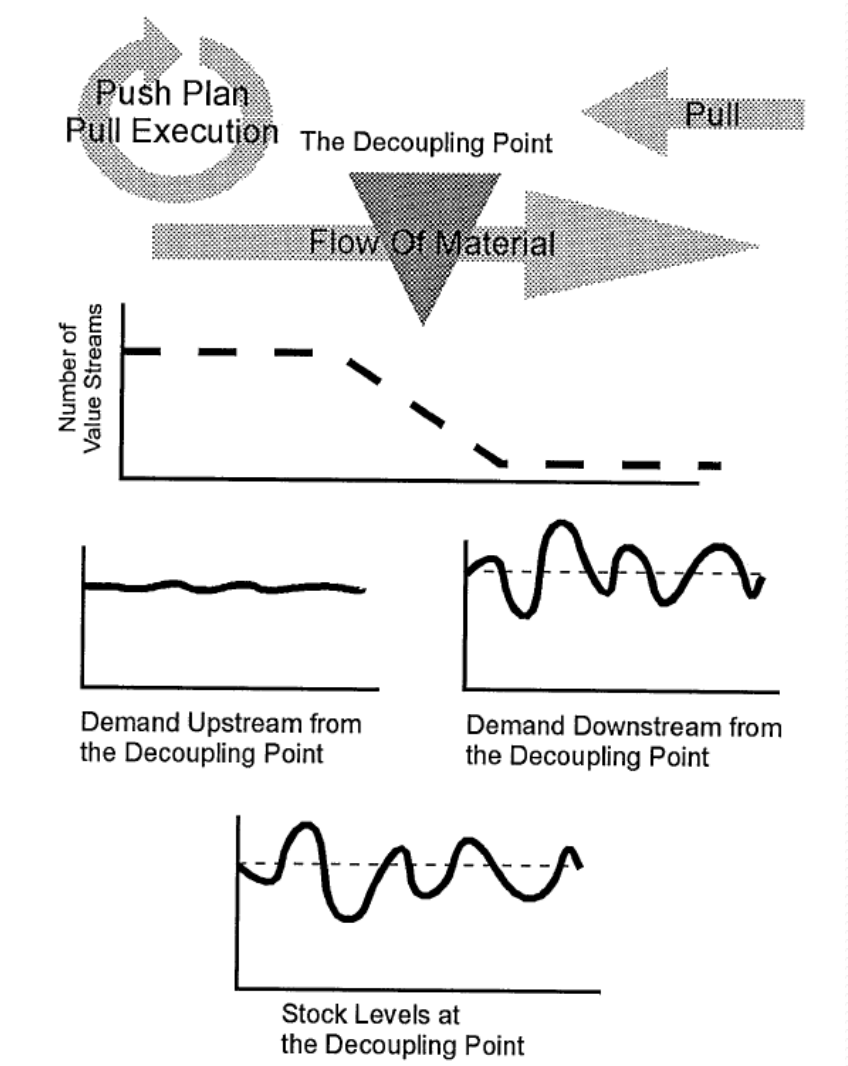
The decoupling point separates the part of the organization [supply chain] oriented towards customer orders from the part of the organization [supply chain] based on planning.



Managing risk in global supply chain networks: postponement



Managing risk in global supply chain networks: postponement



Managing risk in global supply chain networks: speculation

- The principle of speculation (opposite of postponement) states that changes in form and the movement of goods to forward inventories, should be made at the earliest possible time in the marketing flow in order to reduce the costs of the marketing system.

- It includes such actions as forward placement of inventory in country markets, forward buying of finished goods or raw material inventory and early commitment to the form of a product, all in anticipation of future demand.

- The resources in the supply chain need to be directed to those specific products and customers that provide the firm with a competitive advantage. By fixing the form of the finished goods at the earliest point, it is possible to gain economies of scale in production, procurement and transportation.

- However, to ascertain the form of finished goods is more useful in low demand risk conditions (speculation requires high-quality estimates of demand, which is possible under low demand uncertainty).

- An example of speculation is, in case of limited market research resources, to serve customers with similar demographics in culturally-similar countries rather than developing customized products for new markets.

Managing risk in global supply chain networks: demand management

When the supply capacity is fixed, many firms have attempted to use different demand management strategies so that they can manipulate uncertain demands dynamically so that the modified demand is better matched with the fixed supply:

- Shifting demand across time
- Shifting demand across markets
- Shifting demand across products:
  - Product substitution
  - Product bundling

Managing risk in global supply chain networks: demand management

Shifting demand across time: In the service industries such as utilities, airlines and hotels, firms usually set higher prices during peak seasons in order to shift demand to off-peak seasons (revenue management or yield management). By offering different prices at different times, it would enable the firm to increase the profit generated from a fixed supply capacity by capturing customers in different segments who are willing to pay different prices for the service offered in different times (price discount)

Shifting demand across markets: When selling products with short life cycles in different markets, firms need to manage product rollovers (the process of phasing out old products and introducing new products). One of the key challenges for managing product rollovers successfully is uncertain demands in different markets. To mitigate the demand risks in different markets, a ‘‘solo-rollover by market’’ strategy can be adopted (selling the new product in different markets with non-overlapping selling seasons). The solo-rollover by market strategy is more suitable for situations when there is a natural time delay of the selling season in two different markets (leading to non-overlapping selling seasons).

Managing risk in global supply chain networks: demand management

Shifting demand across products:

Product substitution: Product substitution can occur in different settings. First, by selling products with similar features, a firm can increase the product substitutability. Moreover, product substitutability can reduce the variance of the aggregate demand.

Product bundling: In addition to product substitution, a firm can change the demand of the products by developing bundles. There is an increasing number of retail products being bundled together and sold. Examples can be found across a range of products including food (cans of chicken broth), apparel (under garments), cosmetics (shampoo and conditioner), and electronics (computers and printers). When products are sold in bundles, they force the customers to buy all products as a bundle, which will affect the effective demand of the products.

Managing risk in global supply chain networks: hedging

- Hedging is a supply side risk management strategy. In a global supply-chain context, hedging is undertaken by having a globally dispersed portfolio of suppliers and facilities such that a single event (like currency fluctuations or a natural disaster) will not affect all the entities at the same time and/or in the same magnitude.

- Hedging is an expensive strategy because it involves creating multiple options for decision variables. For example, dual sourcing can be used as a hedge against risks of quality, quantity, disruption, price, variability in performance, and opportunism, but dual sourcing requires more investment than single sourcing.

- Another consideration in hedging is the requirement of similar levels of output in terms of quality and service across multiple facilities or supply chain partners. Hence, hedging yields maximum benefits where strong quality and process controls are in place.

Managing risk in global supply chain networks: control/share/transfer

- The control, share, or transfer of risks take the form of vertical integration, contracts, and agreements.

- Vertical integration increases the ability of a member of a supply chain to control processes, systems, methods and decisions. Vertical integration may take the form of forward (downstream) or backward (upstream) integration, and is therefore both a supply side and demand side risk management strategy.

- Vertical integration may increase control and reduce risks in a supply chain, but it changes variable costs into fixed costs.

- Appropriate for innovative products, such as proprietary products and high service requirement products.

- An example is biotechnology companies involved in drug discovery. These companies overcome the uncertainty and need for technology integration through acquisition and partnering strategies. Such strategies help biotechnology companies apply their technologies across a broad range of applications within the drug discovery supply chain to maximize opportunities for product development, thereby delivering competitive advantage through better speed, cost, quality and direction.

Managing risk in global supply chain networks: security

Global supply chain security encompasses information systems security, freight breaches, terrorism, vandalism, crime and sabotage. Security strategy is aimed at increasing a supply chain's ability to sort out what is moving, and identify unusual or suspicious elements.

Security strategy also encompasses working closely with government and port officials to proactively comply with regulations and avoid unnecessary delays at border-crossing points.

For tracking and monitoring the integrity of cargo containers logisticians use RFID and GPS techniques, temper-proof seals and working with port officials to understand and implement safety guidelines.

Managing risk in global supply chain networks: avoidance

Two types of risk avoidance:

- Avoidance strategy Type 1 is used when the risks associated with operating in a given product or geographical market, or working with particular suppliers or customers, is considered unacceptable. In this case avoidance takes the form of exiting (**exit strategy**) through divestment of specialized assets, delay of entry into a market or market segment, or participating only in low uncertainty markets. This strategy aims at driving overall probabilities associated with risk events of a decision to zero by ensuring that the risk does not exist.

- Avoidance strategy Type 2 takes the form of preempting adverse events. For example, avoidance strategy for off-shoring quality issues consists of **site audit and approval, and product audit and approval**. Managers ensure that all participants are on a quality base line so that quality problems are avoided. In this case, reducing the frequency and probability of a risk event is of concern. This usually arises when managers have no option but to venture into high uncertainty demand or supply markets.

Managing risk in global supply chain networks: insurance

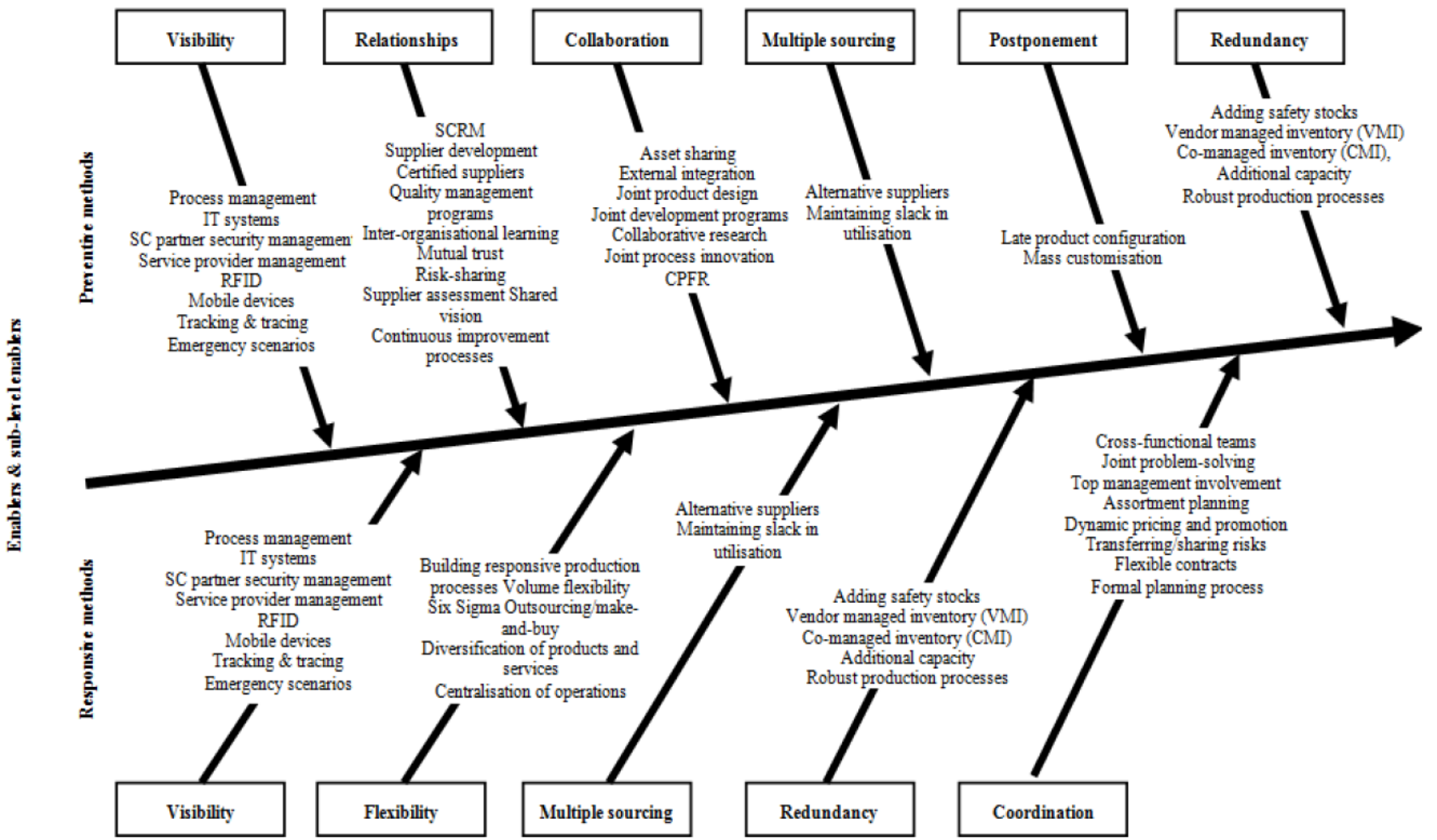
Specialized insurance services that come from diverse insurance industry providers can be an integral component of a company's risk mitigation approach.

Before considering insurance or other risk mitigation solutions, most companies should consider and attempt to quantify the risks they face.

Firms need to work with insurance providers and create a plan to use insurance to mitigate risk where appropriate, based on an objective cost-benefit analysis.

Managing risk in global supply chain networks

Enablers of SCRM (Kilubi and Haasis 2015)



Best practices

Since 2004, Cisco has steadily developed its supply chain risk management capabilities away from a reactive, crisis-orientated approach to one that is both proactive and innovative in the way it addresses a highly outsourced and configure-to-order based supply chain.

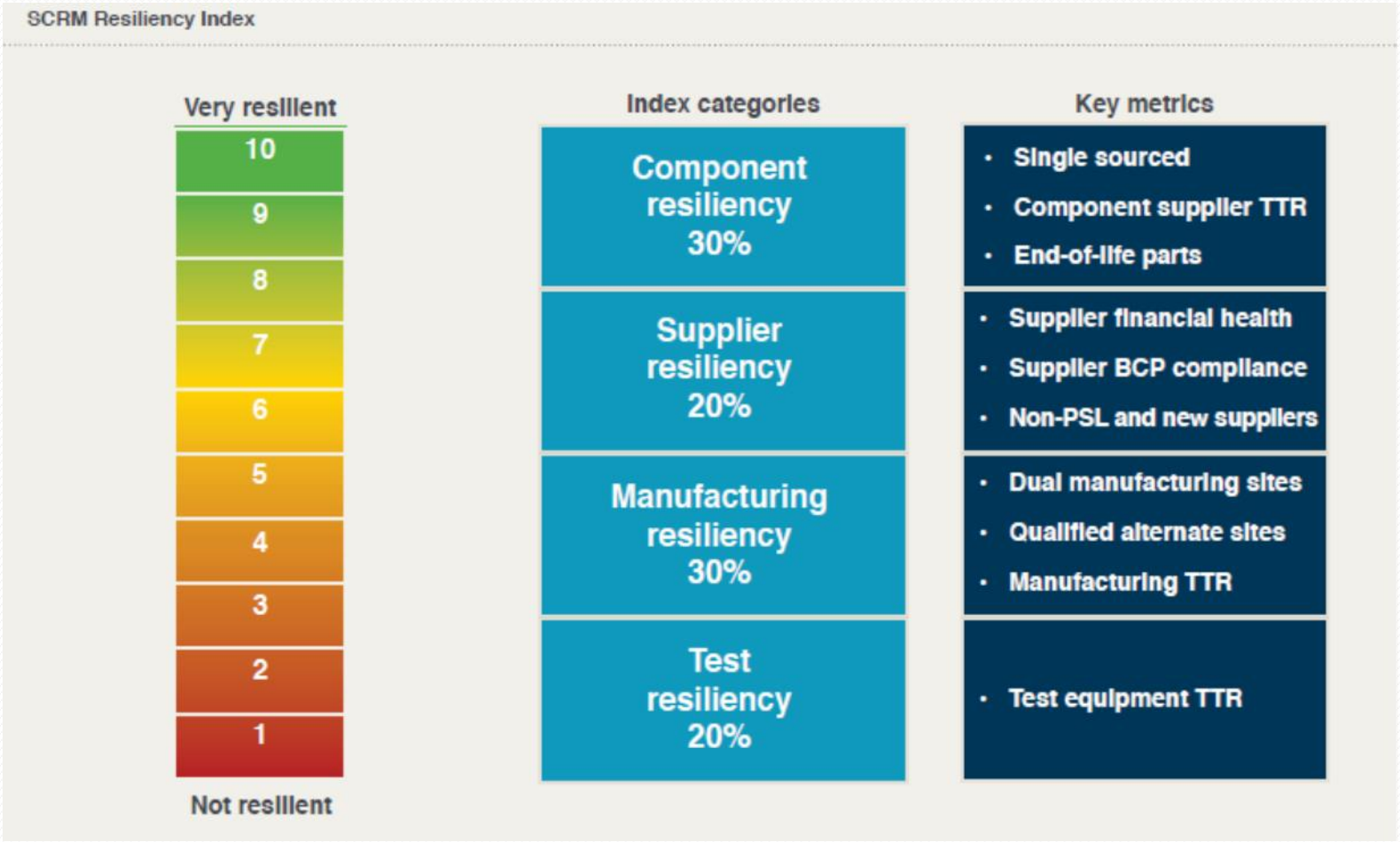
Product resiliency: identifying components where recovery times are outside of the 8-12 week period that Cisco considers acceptable, and working with global supply managers to qualify second sources, line up alternative production sites, create inventory buffers, and so on.

Supply chain resiliency: focused on the company's top 500 products by revenue, this aims to strengthen resilience across its manufacturing, logistics and transportation partners and improve time to recovery if a disruption occurs in the network.

Incident management: 24/7 monitoring of supply chain incidents that are disruptive, or have the potential to be disruptive, to the company's operations.

Business continuity planning: a process used to assess the ability of key suppliers to mitigate the effects of a disruption and recover as quickly as possible. A web-based tool is used to collect more than three dozen data points, while audits and drills are used to test business continuity planning (BCP) readiness and drive improvement activities.

Best practices



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