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PERSPECTIVE

Supply chain logistics risks

From the back room to the board room

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Abstract Risks and uncertainties are ever more noted and factored into decision making today, and those stemming from supply chains are prominent in the competitiveness and viability of companies and organizations. The idea that every supply chain is made up of five internal chain/network constructs is presented, and these are physical, financial, informational, relational, and innovational. Further, four categorizations of relevant product/supply costs are presented as are four types of supply risks.

After the supply shortages, urgencies, and inflation of the Second World War, risk and uncertainty moved into the background of business thinking and decision-making for several decades. Supply availability grew, if not in a home country it did from abroad. Domestic and international transportation speeded up, it became more plentiful and lower in cost. Communications technologies and use increased exponentially thereby creating the impression that distances were shrinking and attendant problems could more easily be addressed. Risk was a function handled by insurance specialists who concentrated on facilities, employees, and export/import shipping losses.

The limen that makes us see the rest

Limen, a psychology term, deals with a threshold in sense. It is defined as the amount of stimulus required to produce a sensation or that level in which one can be perceived differently than another. The 2001 World Trade Tower events and the 2004 Madrid commuter train blasts caused people to see many more risks and uncertainties. The definitions of risk have change and broadened, forever.

Risk is now factored into all business functions and processes. Regulatory changes in the USA have even caused risk to be revealed to the investment community when potential events and situations could cause material impacts on the firm[1]. At a 2003 conference entitled "Rewards of managing risk: identifying and overseeing supply chain risk", the following points showed how a business' limen has recently been more finely tuned[2]:

- Less than 100 workers in a longshoremen's union strike on the US West Coast caused significant disruption of an entire holiday season of consumer product sales in North America and Europe (involving land bridge movements from Asia across North America to Europe). Given the month long round trip cycle of ship movements across the Pacific, some containers took nearly six months to be delivered and for schedules to return to normal.
- The 2003 SARS outbreak in Southwest China and Hong Kong has caused many manufacturers to broaden their risk by also sourcing from other regions and to



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view low cost geographies as a portfolio of sourcing opportunities throughout the world.

- A tree limb falling onto a power line during a local storm caused a regional electrical outage with impact on manufacturing, transportation, and retailing lasting over a week directly affecting over 50 million people.
- It was revealed that 45 per cent of worldwide semi-conductor fabrication capacity is within range of North Korea's current missile capabilities.
- A *Fortune* 25 chief executive officer is worried that he might see his company's name on the cover of the *New York Times* because a small unknown fourth tier supplier of trucking services in a low cost country is using child labor at no pay. It does not matter that this hauler is unknown to the firm; the image and impact on the company's stock is affected by the minds of the newspaper readers.
- Increasingly, major end of supply chain firms, in the form of large retailers and major manufacturers, have so much buying power that their first and second tier supply base is continuing to weaken financially. With the trend of supplier rationalization, this places the buying company at increasing supply risk.
- The food supply chains of the world are being examined for their porous and exposed nature with thoughts of increased control and labeling as "secure supply".

Every one of these examples involve risk in the logistics of supply chains. Every one of them is beyond the traditional risks of product being lost or damaged in transportation, a warehouse burning or being flooded, or a supplier shipping low quality product. With broader risks, the preparations for and protections against them become more encompassing than in the past.

Risks and uncertainty in supply chains

A categorization for identifying risks and uncertainties in supply chains is shown as the five sub-chains/networks to every supply chain:

- (1) *Physical* – the actual movements and flows within and between firms, transportation, service mobilization, delivery movement, storage, and inventories.
- (2) *Financial* – the flows of cash between organizations, incurrence of expenses, and use of investments for the entire chain/network, settlements, A/R and A/P processes and systems.
- (3) *Informational* – the processes and electronic systems, data movement triggers, access to key information, capture and use of data, enabling processes, market intelligence.
- (4) *Relational* – the appropriate linkage between a supplier, the organization and its customers for maximum benefit; includes internal supply matter relationships throughout the organization.
- (5) *Innovational* – the processes and linkages across the firm, its customers, suppliers, and resource parties for the purpose of discovering and bringing to market product, service, and process opportunities.

Viewing a company's supply chains or networks in the contexts of these five sub-chains broadens the realm of supply chain scope and activities. This presupposes that every supply chain is composed of five sub-chains or networks. The first, physical chains, represent traditionally viewed logistics, in the form of transportation, warehousing, handling, processing, manufacturing, and other forms of utility activities. These are the traditional views of the supply chain, often shown in graphical form of suppliers, material receiving sites, manufacturing, distribution centers, and customers. Risks here encompass transportation disruption, the destruction or ruination of goods, the inability to access inventories, manufacturing discontinuity, and more.

Every supply chain maintains a financial sub-chain working in parallel in the form of which party has investments at particular places and at embedded costs, differing costs of capital and rates of expense incurrence, and cash movements and settlements from one firm to the next. The risks here are through settlement process disruption, improper investments, and by not bringing cost transparency to the overall supply chain. Security in settlement processes involving accounts payable (purchasing) and accounts payables (distribution) are the first areas of risk concern as are the management of securitized accounts receivables in between the firms when this mechanism is in use.

Informational sub-chains parallel the physical and financial chains through the processes and electronic systems used for creating events and triggered product movements and service mobilization. The essentials cover efficiency, security, and access. A longer term risk involves the creation and investment into information systems that are neither fully capable nor efficient for intended purposes and future business needs.

Relational sub-chains relate to the chosen linkages between buyers, sellers, and logistics parties in between them. A spectrum of relationships exist ranging from arm's length price ones on the traditional side to closer and more sophisticated ones that include cooperative, collaborative, innovation focused, joint venture and vertical integration forms. As was discovered by sales organizations as well as purchasing departments starting in the late 1980s and early 1990s, each form of relationship in a buyer-seller relationship can bring different forms of value for one or both. More recently, supply chain management and purchasing managers have found the growing need to build stronger internal linkages and relationships across others within the same firm.

Innovational sub-chains map the discovery, flow, creation, and bring-to-market processes both within a firm and involving suppliers and other outsiders. The supply here is the creation and bringing to market a form of innovation for the benefit of the firm. Physical supply chains have often been noted for anecdotal examples of how they constrict or prevent innovation, but more recent attention has been directed toward the more positive aspects of those relationships and information links which support innovation. This is often a strong facet of new forms of purchasing in firms where new product revenue is emphasized from year to year.

Agile logistics addresses supply chain risk (Christopher and Towil, 2001). Here, its scope is generally around customer demand and matching manufacturing and logistics capacity and capabilities to it. By viewing the supply chain in the contexts of these five

sub-chains, supply chain activity scope greatly extends to that of the business as a whole.

Risk at the product/service level

On a micro-level, the product/service risks and uncertainties are influenced by how they are positioned by both buyers and/or sellers. Figures 1 and 2 illustrate these using a variant of the Kraljic (1983) model as espoused in his 1983 *Harvard Business Review* article, first indicating an expanding role of purchasing toward that of supply. By applying axes of value/profit potential versus risk/uniqueeness, a quadrant methodology provides insights relevant to supply costs and risk.

The four quadrants range from generics, which are often low value and low brand impact products such as many office supplies and maintenance items, to bottlenecks, those over-specified, over-engineered, or specific to one supplier items that pose greater risk of non-availability than value in use or sale. Leverage items represent those high volume ones usually component parts of the firm's finished products or services. Finally, criticals are those high impact, usually new to the product life cycle, items that provide today's high margins. The relevant costs and associated risks of products and services are different dependent on their positioning by both buying firms as well as selling firms.

A call for supply chain governance?

The topic of supply chain logistics risk and uncertainty uncovers the many new points of intersection the field has with others throughout the corporation and supply and distribution systems. Other areas of concern have surfaced that will also involve supply chain logistics. In recent years the segregation of genetically modified foods from traditional ones require check, identification, and separation from field through to store shelf. Also on the horizon is the concern for food supply chains secure from

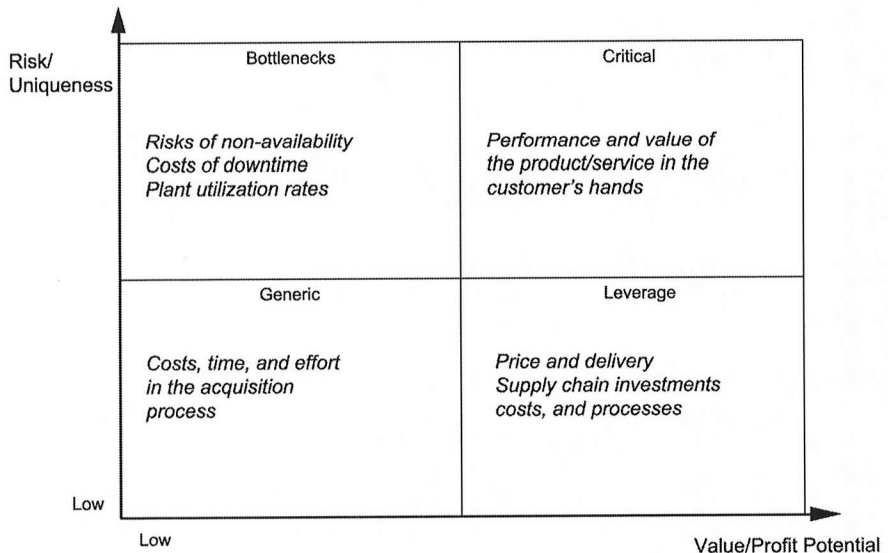


Figure 1.
Relevant product/service
supply costs

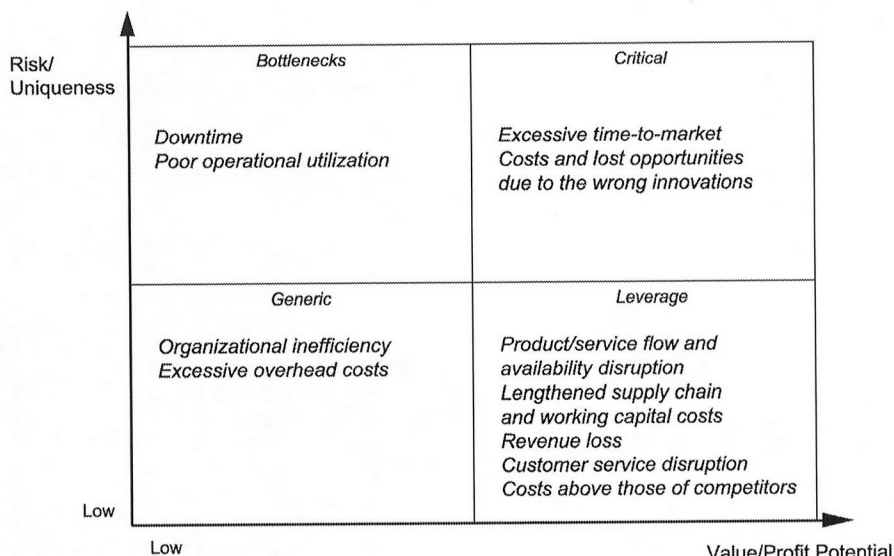


Figure 2.
Product/service
supply risks

potential terrorists' actions. With longer and more complex food supply chains, the need for control is more challenging in this regard.

Some supply chain/logistics leaders are discussing the concept of applying governance models across entire supply chains from third- and fourth-tier suppliers through to ultimate customers and consumers. This requires the identification of each and every step in the process, some forms of certification and oversight, definitions of contractual requirements, models of enforcement, and creates yet another point of intersection by supply chain/logistics through legal arrangements with suppliers and customers.

Risk and uncertainty are evidence that the field is ever-broadening and the practices, processes, concepts, theories must expand with it.

Notes

1. H.R. 3763, Sarbanes-Oxley Act (2002), Section 401(A), Disclosures in Periodic Reports; Disclosures Required, Amending the Securities Exchange Act of 1934 (15 United States Code 78m).
2. A conference jointly held by the Institute for Supply Management and Accenture, Inc., St. Petersburg, FL, June 23-24, 2003.

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