



# SEARCHING OF RISK MANAGEMENT APPROACH WITHIN THE CONTEXT OF SUPPLY CHAIN RISK MANAGEMENT<sup>1</sup>

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## ABSTRACT

In global trade world, the competition between companies are increasing rapidly. Technological innovations and new trends effect the global competition. Especially in supply chain organizations, trends such as increasing the impacts of supply Networks causes some risks. These risks effect all the supply chain organizations and if these risks will not be absenced in advance, devastating and catastrophic impacts through all the supply chain organizations will be inevitable. Increasing, companies need to be vigilant with the risks that can harm the short run operations as well as long term sustainability of their supply chain. The purpose of this paper is to provide a framework to proactively manage supply chain risks. The framework will enable the company to select a set of risk agents to be treated and then to prioritize the proactive actions in order to reduce the aggregate impacts of the risk events induced by those risk agents.

**Keywords:** Supply chain, Risk management

## 1. INTRODUCTION

### 1.1 Risk and Supply Chains

A definition of risk management involves as a result of a number of factors, each reflecting a need and a point of view of the parties involved in the supply chain (Öner, 2012). These are;

- 1- Consequences, individual (people, firms) and collective (supply chains, markets).
- 2- Probabilities and their distribution, whether they are known or not, whether empirical or analytical and based on model subjective.
- 3- Individual preferences and Market collective preferences, expressing a subjective valuation by a person or firm or organizationally or market defined-it's price.

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- 4- Sharing and transfer effects and active forms of risk prevention, expressing risk attitudes that seek to alter the risk probabilities and their consequences, individually or both.

These are relevant to a broad number of professions, each providing a different approach to the measurement, the valuation and management of risk which motivated by real and psychological needs and the need to deal individually and collectively with problems that result from uncertainty and the adverse consequences they may induce and sustained in an often unequal manner between individuals, firms a supply chain or the society at large. For these reasons risk and its management are applicable to many fields. Firms strive to manage risk, handle unexpected disruptions and improve performance in ever changing uncertain business environments (Manal Munir, 2020) In supply chains, these factors conjure to create both a conceptual and technical challenge dealing with risk and its management. As a direct result of risk being statistical distribution rather than a discrete point, there are two main concepts that must be understood in order to carry out effective risk management;

- 1) Risk impact. The impact (financial, reputational, regularity, etc.) that will happen should the risk event occur.
- 2) Risk like hood. The probability of the risk event occurring.

The like hood usually has a time period associated with the like hood of an event occurring during the coming week is quite different from the like hood of the same event occurring during the coming year. Risk management's duty in the supply chain is to identify, analyze, and provide solutions for accountability, control and monitor the risks in the economic and production cycle. (Reza Rostamzadeh, 2018) The same holds true, to some extent, for the risk impact since the same risk event occurring in two different points in time may result in different impacts. These differences between the various levels of impact may even owe their existence to the fact that the organization, realizing that the event might happen, has engaged actively in risk management and, at the later of the two time periods, was better prepared for the event and although it could not stop it from happening, it succeeded in reducing its impact.

Other base concepts in the risk arena include;

- 1-Risk event. An actual instance of the risk that happened in the past.
- 2-Risk cause. The preceding activity that triggers are risk event. (E.g fire was caused by faulty electrical equipment sparking).

Risk itself has risk, as measures of risk often are subject to possible change and so measures of risk will often come with a confidence that tells the reader what prediction of risk but of course this should never be a reason to avoid the sound practice of risk management, since its application has generated considerable benefits even with less than certain predictions.

Logistics managers are under continuing pressure to improve efficiency of their supply chains. For instance; they might improve stocks and use just-in-time (JIT) operations. But JIT illustrates the way that improving efficiency can also increase risks.



In the past the effects of a minor event, such as a late delivery, could be absorbed by stocks-but now it can stop operations and bring an entire supply chain to a standstill. By removing slack from supply chains, managers are also making them more vulnerable-sometimes described as 'taut' or 'brittle'.

A dominant feature of supply chains is that all members are linked together and a risk the one is automatically transferred to all other members. For instance, when one key supplier goes out business; it is not just its immediate customers that are affected, but all other members of the chain. When a manufacturer stops production, all the upstream tiers of suppliers are affected back to the original supplier

It can be seen the way that supply chain risks ripple around the world with one 2003 outbreak of SARS, or bird flu. This was largely contained to southern China and Honk Kong, but restrictions on travel disrupted business operations as far away as Toronto and London. Similarly, in 2005 hurricanes Katrina and Rita both hit oil refineries in the Gulf and Mexico, but the consequent fears of fuel shortages raised prices around the world.

Despite the obvious impact of supply chain risk, this is a new topic that has received very little attention.

The main risks to supply chains do not come from terrorist attacks, but from the broad range of unforeseen events that might affect them (Sheffi, 2002). All supply chains face risks of many different kinds, and the flow of materials is much more likely to be disrupted by an unreliable supplier. Managers can control many of these risks, and the key point is that they should not wait to see what damaging events occur and then start thinking about their response. Instead, they should be proactive, identifying potential risks and planning their response in advance. Then they are prepared and can take immediate action when an unexpected event actually occurs.

## **1.2 Risk and Supply Chain Management**

Risk and its management have traditionally been used as a panacea for the many ills, real, potential and imaginary, that corporate management deals with or sustains, either internally or externally. However, the growth and realignment of corporate entities into strategic supply chains, global and market sensitive, are altering conceptions of corporate risk and as a result the management of supply chains.

Supply chains are based on exchange and dependence between firms, all drawing financial benefits from the arrangement. These benefits include the mind can measure and the imagination suggests.

Collaboration for example, is a well-trumpeted mechanism for maximizing profits while at the same time managing the dependence risks between firms engaged in supply chain exchanges. Collaboration is not always possible, however, for agreements may be difficult to self-enforce and as a result dependence risks are strategic and potentially overwhelming. These issues, specific to supply chains are subject to and create, require that specific attention be directed to their measurement and to their management. Such



measurement will require a greater understanding of a firm's motivations in entering supply chain relationship.

Here, supply chain managers have an important role in achieving this understanding by forcing attention on these risks and in educating corporate managers about what these risks imply, how to measure, evaluate, and internalize them in the costs and benefits calculations they use to reach decisions.

It should be kept in mind that risk is also a great 'motivator', energizing technological innovation, development and growth. Without risk, there can be no profit as well. In other words, in the spirit of financial theory, profits can be realized if supply chain entrepreneurs take risk and these profits are a compensation for the risk they are willing to assume. The reverse might not be true; however-risk taking does not imply profits. For these reasons, risk is a two edged sword, and inducement to create change but also bearing the possibility of negative consequences.

Supply chains have expanded hand-in-hand with the globalization of the economic environment and technological change and the emergence of financial markets entailing corporate objects and business risks that cannot be sustained by individual firms. Risk-sharing through joint ventures, supply chains and other inventive organizational frameworks has both justified the trend to ever- larger supply chains entities but at the same time it has raised a number of issues about risks and their control (such as operational risk; sustainability, political risks and risk externalities sustained by supply chains).

### **1.3 Growing Concern Over Supply Chain Risk**

Logistics managers are under continuing pressure to improve efficiency of their supply chains. For instance, they might improve stocks and use just-in-time (JIT) operations. But JIT illustrates the way that improving efficiency can also increase risks. In the past the effects of a minor event, such as a late delivery, could be absorbed by stocks-but now it can stop operations and bring an entire supply chain to a standstill. By removing slack from supply chains, managers are also making them more vulnerable-sometimes described as 'taut' or 'brittle'.

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## **2. Literature Review**

Over the last 10 years, earthquakes, economic crises, SARS, strikes, terrorist attacks have disrupted supply chain operations repeatedly. Supply chain disruptions can have significant impact on a firm's short-term performance. For example, Ericsson lost 400 million Euros after their supplier's semiconductor plant caught on fire in 2000, and Apple lost many customer orders during a supply shortage of DRAM chips after an earthquake hit Taiwan in 1999. (Tang, October 2006)

Given the high stakes, experts generally agree that managing supply chain disruptions revolves around two goals: first, to thoroughly understand the potential of identified risks; and second, to increase the capacity of the supply chain – within reasonable limits – to sustain and absorb disruption without serious impact. (Xu, 2008)

Supply chain risk management research has mainly mistreated the importance of sustainability issues. Moreover, there is little knowledge about sustainable management of risk and supply chain and the way they impose losses for firms. Risk management's duty in the supply chain is to identify, analyze, and provide solutions for accountability, control and monitor the risks in the economic and production cycle. (Reza Rostamzadeh M. K., 2018)

Nowadays global supply chains enable companies to enhance competitive advantages, increase manufacturing flexibility and reduce costs through a broader selection of suppliers. Despite these benefits, however, insufficient understanding of uncertain regional differences and changes often increases risks in supply chain operations and even leads to a complete disruption of a supply chain. (Chih-Yuan Chu, 2020)

## **3. RISK MITIGATING STRATEGY**

Global supply chains should generally use a combination of mitigation strategies designed into the supply chain along with financial strategies. For example a global supply chain focused on efficiency and low cost may concentrate global production in a few low-cost countries. Such a supply chain design is vulnerable to the risk of supply disruption along with fluctuations in transportation prices and Exchange rates. In such a setting it is crucial that the firm hedge fuel costs and Exchange rates because the supply chain design itself has no built-in mechanisms to deal with these fluctuations. In contrast



a global supply chain designed with excess, flexible capacity allows production to be shifted to whatever location is most effective in a given set of macroeconomic conditions.

### **3.1 Responding to risks**

There is a huge variety of risks; there is a corresponding huge number of possible responses. Again it is impossible to list every option, but we can develop some principles, starting with the basic view that the best response depends on the risk's significance, and this is usually defined in terms of its potential impact. Then risk management consists of carrying on as usual and reacting when an unexpected event occurs.

The key point is that different kinds of risks are best deal with by different responses. You would not expect managers to treat significant risks in the same way as disasters that threaten the organization's survival, so their job is to design and implement the most appropriate responses.

The aim of risk response is to define the most appropriate way of dealing with all risks to the supply chain. Then actions are needed to implement the responses.

As a minimum, any response should:

- a) Allow the supply chain to continue working normally, or with minimum disruption;
- b) Allow appropriate and efficient use of resources;
- c) Be effective in dealing with the risks;

An organization-specific risk means that one may lose out to other firms in the same industry, and this encourages each to work in isolation, trying to maintain or recover its position relative to competitors. This needs rapid, positive action to overcome obvious problems. At the same time, competitors that are not affected may adopt a positive policy, carrying on as normal and learning lessons for the time when they might be hit by a similar problem. Alternatively, they may be opportunistic and try to gain an even greater advantage by focused marketing campaigns, cornering markets, stockpiling scarce materials, charging inflated prices for assistance, developing new sources and markets, introducing new products, changing operations, and so on.

Of course, any positive response means that managers really want to deal with the risks. So the initial requirements for a response are that prefer to ignore them. So the initial requirements for a response are that managers want to deal with the risk, are responsible for the operations in the supply chain, appreciate the significance of risks and their consequences-and have the necessary knowledge, skills, information and motivation. This combination seems surprisingly rare, and risks in most supply chains are not well managed-or not managed at al.

### **3.2 Alternative Responses**

A simple view says that managers either respond to a risk or they do not. They choice not to respond suggests that they have analyzed a risk and found that it is not worth worrying about-presumably because it has a low probability of occurring and very minor consequences, so they accept the risk and do nothing about it.





If they decide to make a response, managers can choose from different types that range from the very easy to the enormously difficult. At one extreme, we have seen that the easiest response is to simply ignore a risk. At the other extreme are very severe responses that managers only use when a risk is so serious that it threatens the organizations' survival. Within this range of responses we can identify several different types.

- Ignore or accept the risk.
- Reduce the probability of the risk.
- Reduce or limit the consequences.
- Transfer, share or deflect the risk.
- Make contingency plans.
- Adapt to it.
- Oppose a change.
- Move to another environment.

Each of these are best suited to different circumstances. As usual, the descriptions of these responses tend to be phrased in terms of harm to be avoided rather than benefits to be encouraged.

### **3.3 Ignore or accept the risk**

Taking a basic view, managers have two options for risks: either they can ignore it and do nothing, or else they can respond and do something. As a general rule, it is easier and cheaper to sit back and do nothing, so it seems sensible to view this as the preferred option. But to justify it, managers have to identify a risk, analyse it and find that the expected impact is small. In particular, the expected value from a risk must be less than the cost of any remedial action. This means that even the most risk averse organizations ignore some risk, which they describe in terms of risk acceptance, retention or internalization.

Retaining a risk means that an organization accepts the complete impact of all possible events, so this is usually limited to the smallest risks. It is certainly the option for risky events that actually occur. Even when the impact is small, it can be annoying and time-consuming to have to start a response from scratch.

In different circumstances; managers can also decide to accept more significant risks, particularly when the cost of making a positive response is high or where mitigating actions could make the situation even worse.

Another point about risk retention is that it is not always a positive decision. When managers fail to identify a risk they effectively ignore it, not as a positive decision but by inadvertently not recognizing it. In the same way, they may underestimate possible consequences and mistakenly accept a risk that is too severe.

### **3.4 Reduce the probability of the risk**

Here managers take actions to reduce the probability that a risky event will occur. For instance, being attacked by pirates is a surprisingly high risk for cargo ship operators in some parts of the world; a way of reducing the risk is to use other routes that avoid the



most dangerous areas. Firm that is worried by environmental or political factor risks can move to a location where these cause less concern.

At a more basic level, warehouses can reduce the risk of shortages by increasing their stocks; delivery firms can reduce their chance of late arrivals by allowing more time for journeys; a firm that is worried by uncertain demand can improve its forecasting, and so on.

These examples suggest that there are essentially two ways of reducing the probabilities;

1-Take actions to reduce the probability that an event will occur –for example; increasing stocks of materials with widely varying demand;

2-Avoid operations where risk occurs-for example, finding substitute products that have less variable demand.

As an example, imagine the risk that a key supplier will hit financial troubles. Two ways of reducing the probability of this risk is to pay a reasonable amount for materials (making it less likely that the supplier will have financial problems.) and switching to another supplier.(avoiding the problem).Other ways of reducing the probability of disruption include careful choice of locations, having good relations with partners, ,arrangements for arbitration and negotiation, using security systems, free flows of information, using quality management, adequate safety measures, learning from experiences, solving underlying problems, involving everyone in the organization, identifying problems early, and host of other methods.

### **3.5 Reduce or limit the consequences**

Often it is easier for managers to reduce the consequences of a risk rather than the like hood that it will happen. As an example, car seat belts do not necessarily reduce the probability of an accident, but they reduce the effects on the people involved. In the same way, reducing the lead time of deliveries from suppliers will reduce the consequences of material shortages. This illustrates the obvious point that there are two ways of reducing the consequences if it does occur. For example, warehouse managers can reduce the harm from falling objects by either revising practices to reduce the number of objects that fall or by insisting that everyone wears hard hats and protective clothing to lessen harm. Ideally, of course, managers would reduce both the probability of harmful events and their consequences.

### **3.6 Transfer, share or deflect the risk**

Risk transfer moves some or all of the risk from one organization in the supply chain to someone more able or willing to handle it. Managers do not generally like risk, so they are inclined to transfer any, especially those where the cost of transfer is significantly lower than the expected cost of internal management.

An important point is that transferring a risk neither eliminates nor reduces it. In practice, the overall risk to a supply chain might even increase when one organization transfers a risk to another organization that is less able to handle it. For instance, there may be a dominant manufacturer in a supply chain, like an automobile manufacturer, that routinely transfers risks to other members of the chain. Insurance is the most common





way of formally transferring risk from one organization to another. This has an insurance company accepting the risk of, say, a fire in return for an agreed premium. The essence of insurance is that the potential loss from a risk is too high from one organization to accept, but an insurance company can pool the risks from a large number of organizations and share the costs.

The potential loss from having your house burn down is so high that you probably cannot accept the risk yourself-but an insurance company can pool the risks from a large number of houses, find the average cost and set an acceptable premium:

**Insurance premium = expected value of loss + operating costs + profit**

Not surprisingly, the greater the risk the greater the premium. On average insurance raises the cost of a risk, as it has to cover additional operating costs and give a reasonable profit, but everyone insured shares this cost, rather than having some individuals critically affected. Insurance gives some recompense for direct damage, but organizations themselves still suffer the disruptions to their own operations and intangible harm. In other words, they do not really transfer the risks and their consequences, but are only given some compensation.

Some people say that it is misleading to talk about risk transfer, and we should really talk about compensation, deflection or, at best, risk sharing.

Risk sharing is also common in finance, where there are many different arrangements, such as the forward or futures market. When a company knows that it will have to buy a large amount number of some commodity, say oil, at some point in the future, it can simply wait and buy the oil on the spot market. But when there is uncertainty about the future price, the company can reduce the risk by agreeing a price now with traders that will deliver the oil at the future date. In effect, the traders are taking the chance that the spot price will be lower than the agreed price, so they make a profit; the company is taking the chance that the spot price will be higher than the agreed price, so it pays less. (And of course, the traders need not buy on the spot market but can also buy on the futures market)

Another form of sharing risks comes with third-party logistics or subcontracting. When a firm agrees to deliver a load to a customer by a specified date, it can subcontract a transport company to make the move and share some of the risks. The responsibilities of each partner are specified in the contract, including the allocation of risk. If the transport company accepts the risk of, say, delays in delivery, it pays the penalties but would expect a higher fee; if the original firm keeps the risk it pays the penalties, but pays the transport company a lower fee.

The partitioning of risk is largely done by negotiation and agreement-and then other factors come into play, such as relative power and attitudes towards risk. The actual division of risk depends on a number of factors, including;

- a) The relative power of organizations, with more powerful ones passing risks to less powerful ones;



- b) The attitude to risk, with risk-averse organizations keen to pass on more risk and paying an appropriate price of this;
- c) The control, where organizations that have most control over the risk should accept a larger responsibility;
- d) The premiums or fees that organizations are willing to pay or receive for accepting a risk;
- e) The expertise and experience, which allow some organizations to deal much more efficiently with a risk;
- f) The views and analyses of the risk, which might differ in each organization.

### **3.7 -Make contingency plans**

Contingency plans come into effect after a risky event actually occurs, so this option has managers taking no immediate action, but preparing plans to deal with an event that might occur. Then if the event does not occur, they carry on as before-but if the event does occur they activate the contingency plans. A contingency plan is often referred to as 'plan B', which is only activated when an event occurs and changes are needed to the usual 'plan A'. For example, a company's normal plans might include moving goods by low-cost road transport, but if there is sudden emergency order it has a contingency plan of using higher- cost air freight.

### **3.8 Adapt to it**

There is a somewhat passive response, where managers accept that an event is inevitable and they try to adapt operations to fit in to the new circumstances.

For example, when there is a risk that demands for a product might suddenly fall, managers modify their operations so that they would still be profitable with the lower demand. For this to work, the organization must be agile able to change operations quickly enough to respond to changing conditions.

The difference between this and contingency plans is that managers take steps immediately to active the plans. This has the benefit of encouraging flexible operations that react quickly to changing conditions and, as changes in the environment affect all competitors, the most flexible can seize their opportunities and gain a competitive advantage. On the other hand, the weakness of this reactive approach is that the environment, and not the organization itself, control the rate and direction of change.

### **3.9 Oppose a change**

Sometimes managers get prior notice that an event is going to happen, such as a government announcing that new regulations will come into force at some point in the future. Then instead of accepting that the event is inevitable, an organization can resist and try to prevent it happening. Individual organizations might campaign against a proposed change, but usually several combine their efforts to form a joint pressure group.

For example, the UK government might propose legislation to limit the working hours of truck drivers; transport operators generally oppose such changes as they increase



costs, so the Freight Transportation Association might lead a campaign against the change.

It is usually difficult to oppose a change that has been well prepared and where decisions have already been made, so this option is often seen as a last resort or sign of desperation when all other options have failed. Presumably, most resistance comes from organizations that are harmed by proposed changes, and their chance of success depends on their relative power.

Realistically, managers must be careful not to spend an inordinate effort opposing changes when they have little chance of success. Unhappily, you often see people continuing to resist events that are inevitable, when they would be better spending time and resources adjusting to the new conditions.

### **3.10 Move to another environment**

This probably the most extreme option and admits that some events are so risky that an organization cannot work with them. If no other option seems to be feasible, an organization can reorganize and move to another market or industry that does not have the risk.

For example, in the 1990s managers' one of the world's largest chemical companies, decided that the risks of remaining in the bulk industry were too great, so it changed its strategic direction, moved out of bulk chemicals and become a much smaller provider of specialized products.

An acute version of this occurs when an organization finds it too risk to stay in its own business environment, but cannot identify another to move into-so it stops working and closes down Essentially, the potential consequences are too severe, with continuing operations having a negative expected value. Occasionally, the risks are so severe that all organizations in a particular industry or market close down, and then the sector ceases to exist.

## **4. Discussion and Conclusion**

In today's competitive business environment, supply chain management, as an effective business philosophy has become more important among both companies.

In principle we know that risk management starts with the recognition that risk exist and need proper management, but some firms don't even reach this stage. Someone within an organization has to recognize the importance of the risk management and be senior enough to make the necessary arrangements.

Unfortunately, the companies omit the importance of risk management through their supply chain organizations. Because they do not aware of the importance of risk management that affects their supply chain processes.

In recent years, companies understand that the key to survival the global trade competition is to implement the most effective risk management in order to generate substantial profit and have a company image.



Nowadays, the businesses and manufacturers face an increasing the importance of risk management in order to reduce the effects of the events which are inevitable for them. On the other hand, these affects decrease the level of profit, the customer satisfaction and most important thing that these effects cause catastrophic results through the supply chain. If these affects will not be absence in advance, devastating affects damage the supply chain organizations. Consequently supply chain organizations structure damaged visibly.

The fundamental challenge of supply chain organizations is that processes damaged easily but cannot be corrected easily because the supply chain processes have a complex structure and all the organizations interconnected with each other. Another factor that serves to add the complexity to understanding the supply chain risk management is the high level of charges that is used to correct the result of damages.

As a result, these arguments predicate that supply chain risk management is critically important for the organizations in modern business environment.

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