

Supply chain risks and management

- Jyri Vilko & Jukka Hallikas

Introduction

- Previously supply chains were thought to be purely operational and they were ignored and trivialized
- Supply chains have become the center of attention in many firms for improving organizational competitiveness in the twenty-first century
- In the recent articles and books the focus has been in the need for systematical analysis of the supply chain vulnerability
- Current trend in logistics are increasing risks in supply chain
- Supply chain complexity and length have caused disruptions in it to become a critical issue for many companies

Trends affecting supply chains

- Globalization
- Development of the communications and other technologies
- E-business
- Agile logistics
- Integration of supply chains
- Outsourcing
- Etc.

Supply chain

- Is the linkage between supply and demand
- Binds together the supplier and the customer
- Supply Chain risks are becoming inadvertently increasing and the disturbances affect automatically all other members upstream of the supply chain

Defining of the concepts

- Risk
 - A threat that something might happen to disrupt normal activities which stop things happening as planned
 - $Risk = P(Loss) * I(Loss)$
 - Where risk is defined as probability (P) to loss and its significance (I).
 - Purely negative
- Supply chain
 - Consists of a series of activities and organizations that material and information move through on their way to final customer
- Supply chain risk management
 - Is the function responsible for all aspects of risk to the supply chain; it ensures that the principles established by the senior managers are applied to logistics risk
- Vulnerability
 - An exposure to serious disturbance, arising from risks within the supply chain as well as risks external to supply chain

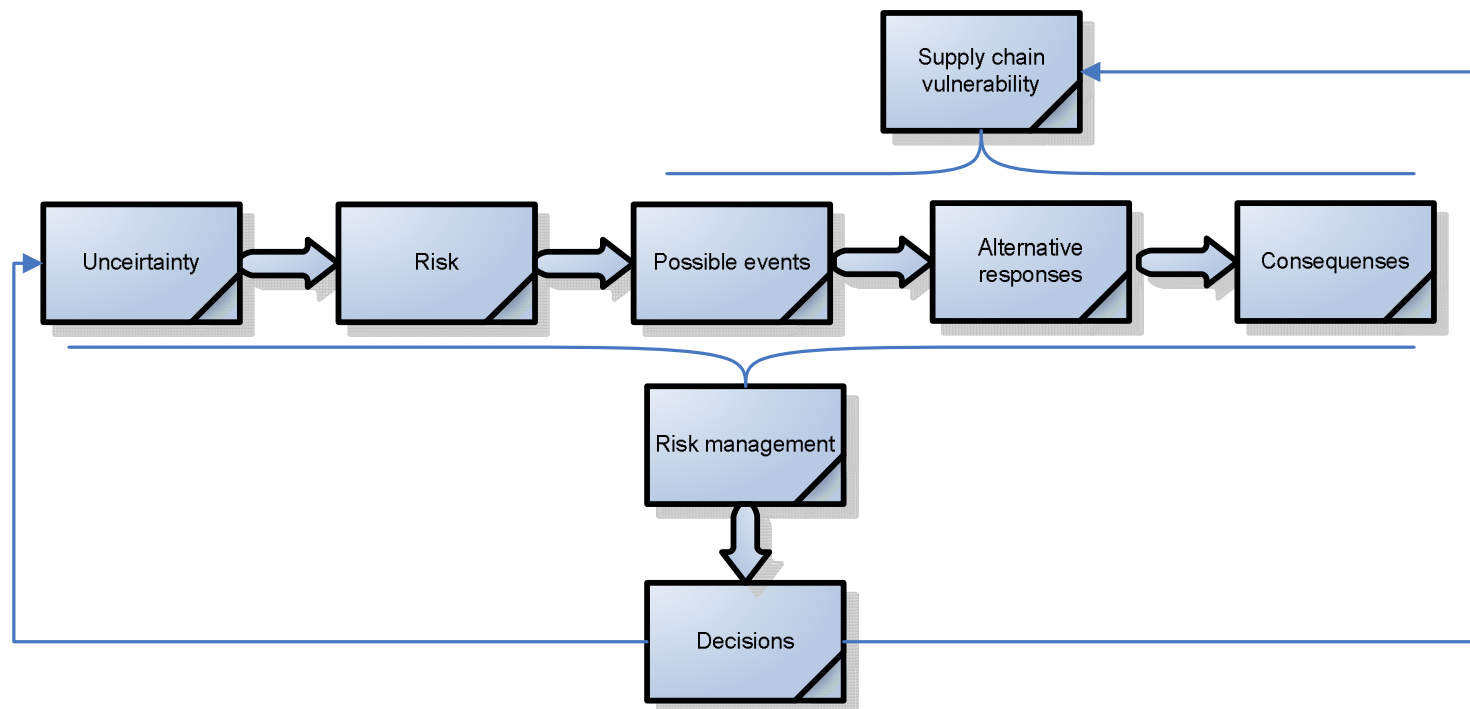
Categorization of risks

- There are many categorizations made for risks
 - Operational or disturbing
 - Supply-side, demand-side or catastrophic
 - Etc.
- The chosen risk classification is presented by Jüttner (2003)
 - Internal risks as those that arise from the organization,
 - Supply chain risks as those external to organization but within the supply chain and
 - External risks as those external to supply chain that are arising from the environment.

Supply chain risk management

- Christopher et al. (2002) says that "it appears from the available literature that the implementation of risk management in supply chains is still in its infancy", "Little research has been undertaken into supply chain vulnerabilities" and "awareness of the subject is poor".

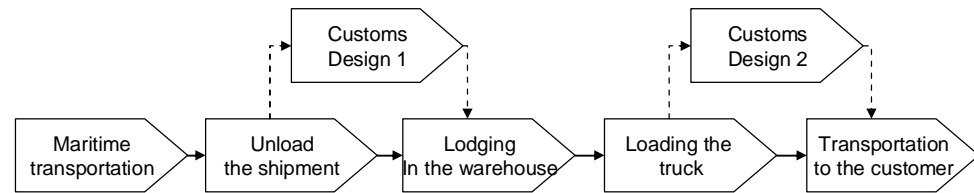
Relations between supply chain risk, vulnerability and management



Risk management framework

- Basically much of risk management focuses on three core activities:





Identifying supply chain risk

- Identifying supply chain risks is a key activity that forms the foundation for all other aspects of supply chain risk management
- In order to manage something, one must have a holistic understanding of it. Finding out the supply chain structure is therefore imperative
- For risk identification there are several tools available
 - For example the Failure Mode and Effects Analysis (FMEA)

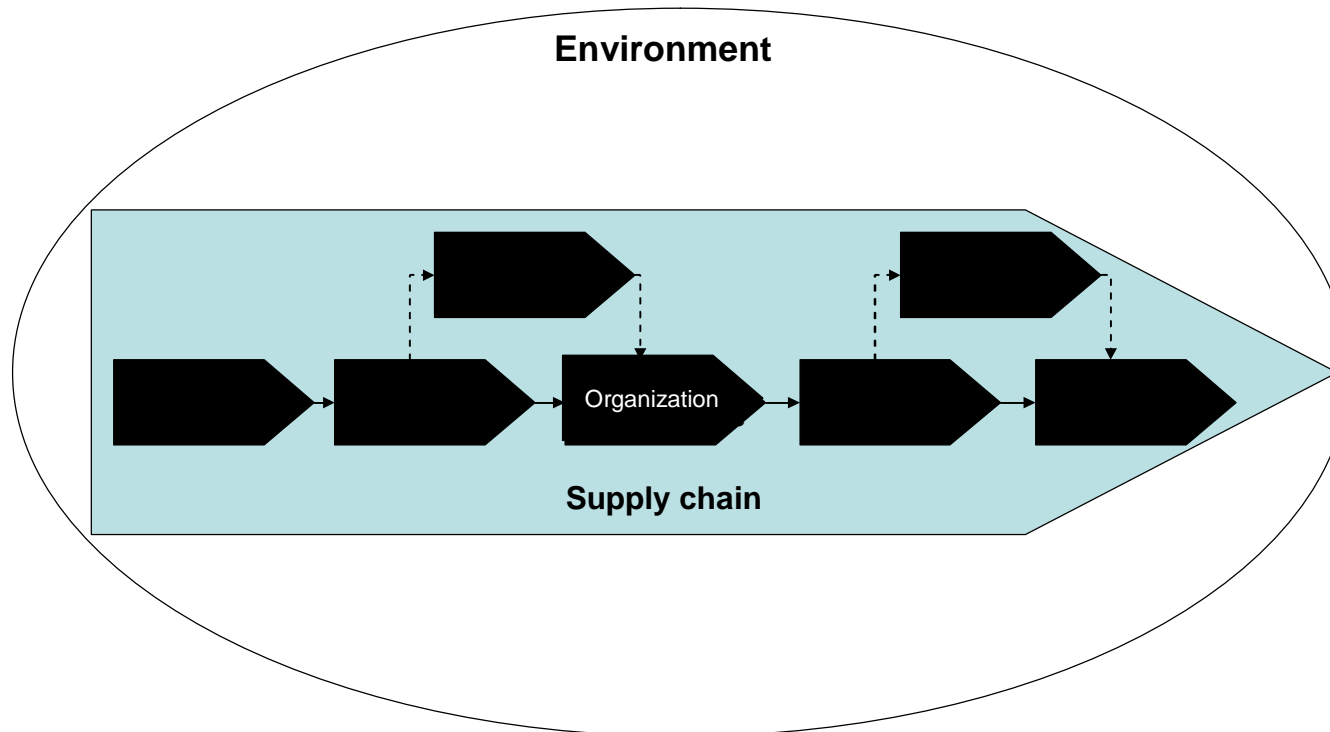
Failure Mode and Effects Analysis example

Supply chain step	Potential failure mode	Potential failure effects	Potential causes
Maritime transportation	Ship sinks	Product lost	High waves caused by climate change
Unload the shipment	Product dropped while unloading	Product broken	Poor skills of the employees, condition of the unloading equipment
Lodging In the warehouse	Product lodged in wrong place	Shipment late	Poor organization of the warehouse
Loading the truck	Product tied up wrong	Product damaged	Haste, Inadequate instructions
Transportation to the customer	Truck drivers strike	Product late	Labour unions conflict with employers
Unloading at customer	Product dropped from forklift	Product damaged	Poor handling equipment and training

Response designing

- Waters (2007) suggests the following range of different responses to risks
 - Ignore or accept the risk
 - Reduce 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

Risk sources in supply chain



Conclusions

- The main contribution of this paper was to gather the state of the art literature and definitions of supply chain risk and related concepts
- This study will work as a starting point to STOCA project as the projects empirical investigations to supply chains
- For identifying risks in a supply chain it is essential to know the structure of it
- The understanding from which level the risk derive, helps managing them, therefore the tools for that must be investigated properly
- The responses to risks should be defined according to the consequences of risk occurring