



**PUBLICATIONS OF THE HAZARD PROJECT**  
**21:2018**

# **THE RISK MANAGEMENT PROCESS AND THE SUPPLY CHAIN SECURITY**

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Turku 2018

ISBN 978-951-29-7198-5

2018

**PUBLISHED BY:**  
**HAZARD Project**  
**Turku School of Economics**  
**University of Turku**  
**Rehtorinpellonkatu 3, FI- 20014 University of Turku, Finland**  
<http://blogit.utu.fi/hazard/>

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**Keywords**

Disruption risks, Managing disruption risks, Securer flows, Supply chain, Supply chain security, Supply chain risk, Supply chain risk management, Risk handling, Risk handling process, Risk management process, Vulnerability.

**Abstract**

In this report the risk management process is presented as consisting of 14 different steps and each step is described and discussed. Also widened aspects on the risk management process are treated, as well as the economic significance.

The modern society of today is, in many respects, a vulnerable society and to a great extent built up round supply chains. In these strictly integrated chains, with a number of often globally dispersed links, there is a constant flow of physical goods, services and also combinations of goods and services. A disruption within any of these flows may very well lead to far-reaching negative consequences.

The private company's (or organization's) supply chain and its surrounding environment is exposed to constant changes, which affects its risk picture. It may be difficult to completely avoid being affected by disruptions and disturbances, and perhaps not even desirable, considering the high risk handling costs this probably would require. On the other hand, it is important not to be affected unnecessarily hard, since this of course means a waste of resources. In competitive business activities it is especially important not to suffer worse than the competitors; preferably you should be less affected. Efficient risk management can thus provide a vital competitive advantage.

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**ABOUT THE AUTHOR**

Ulf Paulsson is a retired Senior Lecturer at School of Economics, University of Lund, and also a Doctor of Philosophy (PhD). He has many years' experience of research, teaching and tutoring in the fields of Logistics and Supply chain management. During the last decade, more and more focus has been targeted at the disruption risks of the flows (Supply Chain Risk Management) and Paulsson has written a doctoral thesis and several research reports in this field.

## 1 THE ALBUQUERQUE ACCIDENT

In 2000 a minor fire caused by lightning in a production cell, a so-called clean room, at a sub-supplier's (Philips) plant in Albuquerque, New Mexico (USA), affected the delivery of electricity, causing overheating, which started a fire. The fire was extinguished in less than ten minutes, but it made the production room unclean and destroyed the production equipment. From a plant perspective the impact was low, but for Ericsson it was huge because the needed component – a radio frequency chip for their new mobile telephone T 28 – was single sourced. At that time there was a general lack of capacity for that kind of component all over the world, and still after 6 months the production of chips in the Albuquerque plant was only 50 % of normal production. Ericsson therefore lost many months of production of the T 28 model, which had just been very successfully launched, and was not able to meet market demand. For a considerable period of time, sales were lost and so were market shares. The accident also had an impact on Ericsson's decision to stop operating on the mobile phone terminal market on their own (Norrman & Jansson, 2004; Sheffi, 2005).

In his presentation of the half-year result for the period 1/1 – 30/6 2000 Kurt Hellström, the managing director of Ericsson, said that if it hadn't been for the missing components the mobile telephone division would have presented a profit; now it was a loss of 1,8 billion SEK (Sydsvenska dagbladet, 22 July 2000, p. A10).

The Albuquerque factory also supplied Nokia, but they were not at all as badly hit as Ericsson. One reason for this was that they were not single sourced, another that they realised much earlier than Ericsson the extent of the negative consequences and could take actions that mitigated the consequences. Nokia had obviously both less risk exposure and better risk handling capacity than Ericsson in this situation. (Chopra & Sunil, 2004, p. 53).

What is interesting to notice about the Albuquerque accident is that it could have been anticipated (power failure is a well-known phenomenon), been avoided entirely (if e.g. the Albuquerque factory had installed a backup power unit) and the consequences could have been mitigated (if Ericsson had, e.g., had several suppliers instead of just one).

## 2 THE RISK MANAGEMENT PROCESS

### 2.1 A basic risk management model

The International Electrotechnical Commission (IEC) has developed the following model, which is often referred to, of the risk management process and its different parts.

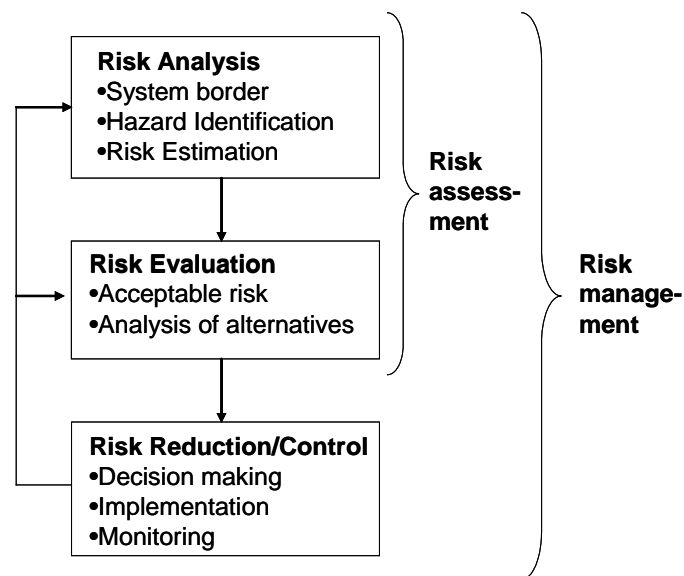


Figure 2.1: A risk management model by IEC (IEC, 1995, p. 41).

*Risk analysis* is the initial phase in the risk management process. First the system border of the project/study is set. Then the hazards are identified and estimated. The second phase is *risk evaluation* i.e. to evaluate those risks compared to a defined acceptable risk level. Risks under this level are sorted out and not further considered. For the not acceptable risks new alternatives are looked for and analysed. The third and final phase in the risk management process is *risk reduction and risk control*. This includes decision making, implementation and the following up of the action plan. These are important activities. Without an effective change exertion with continuous feedback, the time and resources spent on risk analysis and risk evaluation can be wasted.

### 2.2 The risk handling wheel

The risk management process is below, using the IEC-model as a base, described as consisting of 14 successive steps:



1. The process starts when, for some reason or other, you are dissatisfied with a certain risk situation. Perhaps you feel that you do not have a good grasp of the risks – where they are and how big they are; or you think that the risk management costs have gone up; or you have eyed your business colleagues and seen that they handle their risks in a different way; or perhaps you feel that the situation is unsatisfactory for some other reason.
2. Who is responsible for the current risk area and how much does the person in question care about his/her area of responsibility?
3. Delimit and specify the risk area
4. Identify the risks
5. Assess the risks
6. Decide what risks are unacceptably big
7. Pick out the ones to focus upon among these risks
8. Identify what is critical for the risks in focus
9. Look for alternative risk handling methods
10. Evaluate the found options and choose the one/those that should be implemented
11. Secure support for the suggestion with the responsible person
12. Decide and implement
13. Follow up
14. Good enough? If not, start the process all over again from step 1, by specifying why you are not satisfied with the risk situation.

Thus, the risk management process is a circular process, starting with the answer 'no' to the question "Good enough?". If the answer to the question is still 'no' after going over all the above steps, a new round will be started and in principle you can keep it up round after round without ever reaching the answer 'yes' to the question "Good enough?". The different steps in the risk management process can be compared to a wheel, which we will call the risk handling wheel.

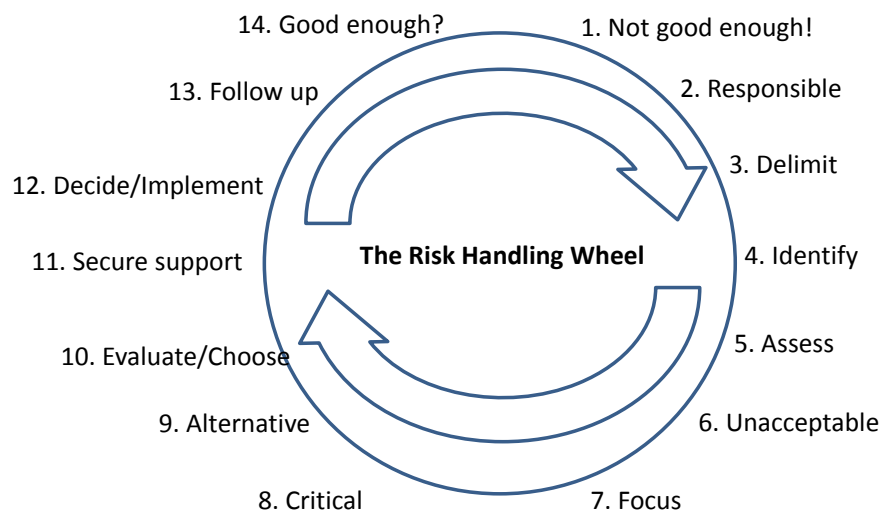


Figure 2.2: The risk handling wheel.

If we actively pursue the risk management process this means that the wheel is in motion and that we hopefully, with each round, have moved a bit towards our desired goal.

### 3 SECURER FLOWS

#### 3.1 Actions concerning known and unknown risks

The total risks can be divided into known, partly known and unknown risks.

For the *known risks* the challenge is to resist different trends, i.e. try to disregard from the fact that certain risks are especially in focus at present. To be reasonable, the more critical the risks are, the more attention they should get.

When it comes to the *partly known* risks it is important that they are examined closer to increase our knowledge of their capacities and of the danger they represent. By doing so, we can hopefully transfer them to the group of known risks.

However, the most serious risks are probably the *unknown* ones – quite simply because we do not know what they are and consequently cannot protect ourselves against them. Therefore, it is important to try and transfer as many risks as possible from the unknown group to the known group, or at least to the partly known group.

#### 3.2 Do not forget the widened aspects!

Suppose a specific risk handling method/measure is being considered, since you have identified a certain risk that you would like to reduce or perhaps even eliminate. One example of this may be to build up a buffer stock of finished goods. The reason for this can be that you have single sourcing for one critical component and that the supplier of this component is found to be lacking in adequate fire protection in his manufacturing halls. We can call this the *focused risk handling possibility*.

However, such a buffer stock of finished products can also be used for delivery problems of other components and in case of production standstill in your own production site. In other words, the considered risk handling measure also leads to a number of other *widened risk handling possibilities*.

Besides, to have a buffer stock is a good thing if there would be a sudden increase in demand. The company then has the possibility to carry out a quick delivery and, if the business rivals cannot handle this, it might result in increased market shares for the company which can be difficult for the competitors to catch up on. Thus, the buffer stock can also be seen as an “expansion possible-maker”, i.e. it *facilitates offensive actions*. The step to build up a buffer stock of finished products is therefore *both* possibility-creating and risk-reducing.

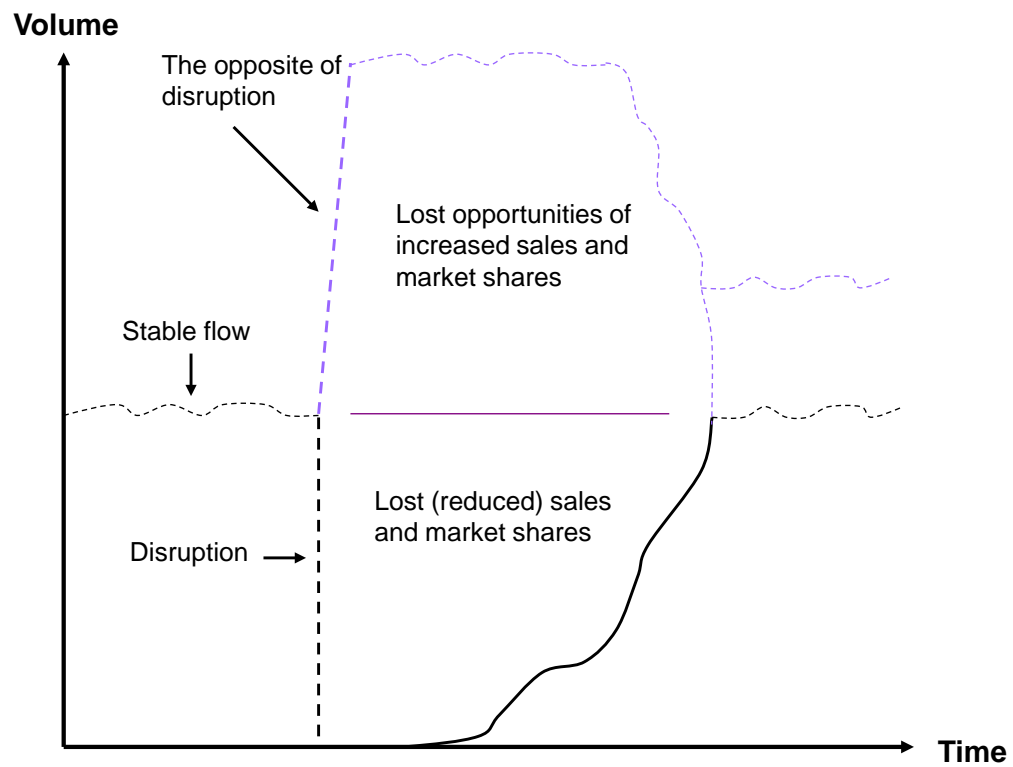


Figure 3.1: The offensive aspect of risk management.

So, when calculating "the profitability" of the individual risk handling measure, you should include the focused risk handling possibility as well as the widened risk handling opportunities and the facilitation of offensive action.

## 4 THE ECONOMIC IMPORTANCE OF RISK MANAGEMENT

### 4.1 As protection for economic values

The Albuquerque accident is an extraordinary event that led to economic consequences of many billions. However, the question is how relevant this kind of events is to the everyday business life?

“The survey polled some 600 finance executives in large organizations around the world. When asked to identify the top risk that affected their company’s primary revenue driver, 25 percent of the respondents from North American companies and 19 percent of those based overseas – the largest proportion in both cases – chose supply-chain exposures.”

*Brannen & Cummings, 2005, “Number-One Revenue Threat: Supply Chain Disruptions”. Business Finance. Page 12, 5<sup>th</sup> of December 2005*

As can be seen in the above quote, the vulnerability in the company supply chain is a high-priority field in most companies today.

### 4.2 As incentive of economic activities

However, the importance of taking an interest in risks and risk management reaches beyond the will alone to prevent or make it more difficult for negative situations to occur. Bernstein (1996) has studied the view of risk and risk management from a historical perspective and realized that a decisive step for human development was when man changed the way to look upon risks, from something that was impossible to influence and fated, to something we could identify, analyse, perhaps even calculate and benefit from.

“The capacity to manage risk, and with it the appetite to take risk, and make forward-looking choices, are the key elements of the energy that drives the economic system forward.”

*Bernstein 1996, Against the Gods – the remarkable story of risk, p. 3*

## 5 POSSIBILITIES FOR SECURER FLOWS

J. Reason (1997, p. 4) says that risk management generally means balancing production and protection in a proper way. So you could say that the possibilities for securer flows is a question of balancing production and safety activities in more creative ways based on new, untraditional risk handling options.

To be more precise, you can handle disruption risks in supply chains more effectively by:

- increasing the level of awareness of the growing vulnerability in today's supply chains
- being aware that the worst risks probably are to be found among the unknown risks of today
- trying to transform unknown risks into known risks, or at least into partly known risks
- ignoring that some of the known risks tend to be "fashionable" at the moment
- increasing the ability to, at an early stage, identify the critical, flow-related risks
- widening the search process in order to find new, untraditional, creative risk handling options
- not assuming that risk management always has to be expensive – there might be options that are free of charge
- realizing that the person most suited to have an impact on a certain risk, may not be motivated enough to change it
- assuming that risk assessment and risk management are perishables – therefore, avoid making an over-detailed risk analysis, because before long it has to be done all over again
- seeing the risk handling of the flow-related disruption risks not as a necessary evil but as something that can be used as an offensive competitive advantage!

## 6 WHEN DO YOU BECOME A HERO?

In the classic fairy tale of “Ronia the robber's daughter (*Ronja Rövardotter*)” by Astrid Lindgren, Birk saves Ronja, at the very last moment, from being hurled down a big waterfall and he becomes a hero. Ronja has come too close to the river and fallen into the water, unable to get up on her own. She is swept away by the river and comes closer and closer to the threatening waterfall and cries out for help – a cry that Birk happens to hear. He rushes off to help her and becomes a hero.

But what if Birk instead had put up a fence along the river that stopped Ronja from coming close to the water, falling into the river and, with that, risking to be hurled down the waterfall? Would Birk still be a hero? Probably not.

If you solve a critical situation you have a chance to become a hero but probably not if you take preventive actions, however skilled and competent you are. Still, in the long run, the preventive work is the most important – not “the emergency actions”.

## References

- Bernstein, P. (1996). *Against the Gods – the remarkable story of risk*. New York: John Wiley & Sons Inc.
- Brannen, L. & Cummings, J. (2005). Number-One Revenue Threat: Supply Chain Disruptions. *Business Finance*, Vol. 11, No. 12, p. 12.
- Chopra & Sodhi (2004) “Managing Risk To Avoid Supply Chain Breakdown”. *MIT Sloan Management Review*, vol. 46, issue 1, 2004. p. 53.
- IEC (International Electrotechnical Commission), 300-3-9, 1995. *Dependability management - part 3: Application guide - section 9: Risk analysis of technological systems*. IEC 1995.
- Norrman, A. & Jansson, U. (2004) “Ericsson’s proactive supply chain risk management approach after the Albuquerque accident”. *International journal of physical distribution & logistics management* Volume 34, number 5, 2004, pages 434-456.
- Paulsson, Ulf (2007). *On Managing Disruption Risks in the Supply Chain – the DRISC model*. A doctoral thesis. Department of Industrial Management and Logistics. Lund University. Lund. ISBN 978-91-976974-1-5. 377 p. <http://www.lu.se/lup/publication/598913>
- Reason, James (1997) *Managing the Risks of Organizational Accidents*. Ashgate Publishing Limited. Aldershot. UK.
- Sheffi, Yossi (2005) *The Resilient Enterprise*. The MIT press. Cambridge, Massachusetts, USA.
- Sydsvenska dagbladet, 22 July 2000, p. A10.



HAZARD project has 15 full Partners and a total budget of 4.3 million euros. It is executed from spring 2016 till spring 2019, and is part-funded by EU's Baltic Sea Region Interreg programme.

HAZARD aims at mitigating the effects of major accidents and emergencies in major multimodal seaports in the Baltic Sea Region, all handling large volumes of cargo and/or passengers.

Port facilities are often located close to residential areas, thus potentially exposing a large number of people to the consequences of accidents. The HAZARD project deals with these concerns by bringing together Rescue Services, other authorities, logistics operators and established knowledge partners.

HAZARD enables better preparedness, coordination and communication, more efficient actions to reduce damages and loss of life in emergencies, and handling of post-emergency situations by making a number of improvements.

These include harmonization and implementation of safety and security standards and regulations, communication between key actors, the use of risk analysis methods and adoption of new technologies.

See more at: <http://blogit.utu.fi/hazard/>

