STUDY

ROI of Supply Chain Risk Management

eckseler-consult

riskmethods

STUDY

ROI of Supply Chain Risk Management

Contents

1

Foreword

For many years, companies have been reducing their added-value depth as part of globalization, and have been shifting this to external, globally active supply networks. This results in numerous new, global and complex supply chains with worldwide business partners, on which companies are increasingly dependent. Accordingly, the production depth in German industry has, especially in the last two decades of globalization, fallen to only 30.2 %[1]. In some sectors, such as the automobile industry, 1st and 2nd-tier suppliers have consequently developed into the real innovation drivers of the automobile manufacturers. "Best-Cost-Country-Sourcing" also leads to new supplier relationships. Business partners are often located in emerging markets, where changes in political, macro-economic as well as infrastructural risks are extremely difficult to monitor. Measures for aggregation of requirements in procurement have in turn led to compressed, highly focused supplier portfolios – which has resulted in a continually increasing risk position in the event of a disruption within these supply networks.

A study by Zurich Versicherung "Strategic risk: do not forget your supply chain!" investigated the effects of supply chain disruptions based on thousands of SEC reports. On average, the consequences were:

- **25 % reduction in stock prices (effect over 2 years)**
- **9 % drop in revenue**
- **11 % increase in costs**
- **14 % higher delivery capability of "SCRM Leaders" compared to other companies[2]**

With significant effects such as these, it is no surprise that, according to Zurich, many companies with long-term supply chain disruptions never recover.

Besides globalization, another megatrend is responsible for the increased high public awareness of ethical, corporate sustainability in supply chains and supplier relationships: digitalization. Sub-human working conditions in far-off regions, workplace accidents due to defective safety provisions or environmental pollution on the part of suppliers are made available to the world's public within minutes by means of a smartphone photo and a tweet or YouTube video. This happened to iPhone supplier Foxconn **(http://bit.ly/1AKKA3Y)** in the case of the suicides due to catastrophic working conditions and to a Chinese supplier to GM **(http://onforb.es/1qDxWwE)** in the case of an accident with over 65 worker casualties as a result of a dust explosion. Reputations can be ruined quickly, and revenue can fall if a manufacturer does not pay sufficient attention to the conditions under which their suppliers manufacture in foreign countries. Because for many end customers, it is not just the price at the checkout that counts but also at what price the product was placed on the market. Self-imposed ethical principles and "digital transparency" require that companies identify ethical risks of this nature in supplier networks and that they take appropriate measures.

Identification, analysis, forecasting and reduction of risks in supplier networks comprise a new task that is, in parts, not yet well-established in companies. This study aims to provide companies with a guideline for calculating the return on investment of tool-based **supply chain risk management (SCRM)**. For this, qualitative usage aspects are also taken into consideration, and quantitatively demonstrable reference examples listed.

Dr. Hugo Eckseler
Graduate Physicist, Consultant

[1] Source: German Federal Statistics Office.
[2] Best-in-class supply chains with risk management have a 97 % service level vs. 84 % for all others – Aberdeen in "The Chief Supply Chain Officer's View of Supply Chain Disruptions - How the Best-in-Class Respond".

2

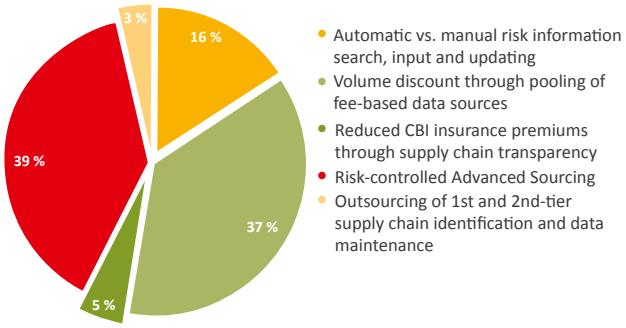
Executive Summary

Determining the return on investment represents an important aspect when deciding on a professional, automated and software-supported **supply chain risk management (SCRM)** solution. The study has detailed information on how

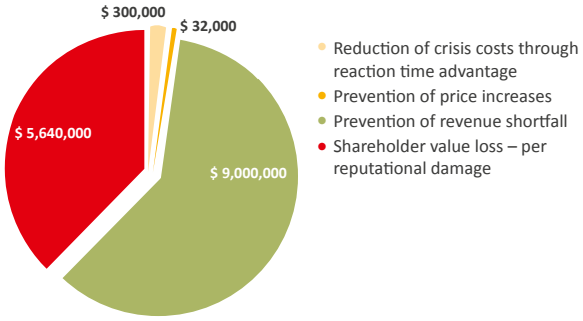
- savings through process efficiency
- avoidance and reduction of crisis costs

provide the source for individual potentials that can be evaluated in monetary terms, and offer a tool for individual determination of **ROI** as a no-charge download.

Distribution Savings through process



Avoidance and reduction of crisis costs



Results:

For a typical medium-sized manufacturing company with revenue of 200 million USD, the actual savings through process efficiency alone quickly amount to considerably more than 200,000 USD per annum. In particular, these hard-to-calculate savings help to justify the investment decision, and ensure budget neutrality as early as the first year of acquisition.

A significant benefit of SCRM is generated by the immense potentials through risk prevention measures: Losses of up to 7.5 % of revenue (approx. 15 million USD in our sample company) can be avoided by means of risk prevention, or can at least be considerably reduced in a crisis situation.

Values such as these assist in deciding the success of an entire fiscal year, as well as the existence of a company. Companies derive additional financial room to maneuver and released personnel capacity to be able to increase ROI through risk prevention measures, in addition to acquisition of methods, tools and know-how.

Success factors:

Successful companies with professional SCRM methodologies, such as the world's largest automobile component supplier BOSCH, the leading technology group Siemens, or the most profitable European telecommunications group Swisscom agree that they have placed a sharp focus on common selected criteria from a process, organizational and tools perspective. This includes:

- Integrated methodology – coverage of all types of risks
- Clear responsibility of SCRM in an organizational unit
- Integration of all internal stakeholders in the cross-functional risk management process
- Use of a common IT-supported platform
- Supply chain transparency in the relevant tiers in each case (n-tier SCRM)
- Management of measures as an integrative component
- Use of all available structured and unstructured data sources
- Transformation of information into relevant, dependable intelligence
- Components of risk intelligence within the supplier network
- Support for different application cases for cross-functional partners
- Predictive analytics for risk prediction and prevention

Success factors

3

Process Model of the Study and Definition of Terms

The aim of this study is to investigate the determination of the return on investment (ROI) of a software-supported solution for supply chain risk management. The term **supply chain risk management** (abbreviated to SCRM) is used as a synonym. SCRM is taken to mean the identification, analysis, forecasting and influencing of risks in supplier networks (1-n tier). In this study, all yields and returns for success of the company that promise amortization across the period of use are considered as ROI for evaluation of the individual investment in SCRM. Both amortizations that can be evaluated in monetary terms and qualitative usage aspects are taken into consideration as yields and returns. The period of use is specified on the basis of the current balance-sheet write-off period for hardware and software investments of three years. Budget neutrality implies that an investment is amortized within 12 months. Some base data for determining ROI are only available on a "per crisis" basis, such as the financial implications of actual shareholder value losses that occur. The determination of ROI here is based on the stochastic probability of occurrence of significant crisis situations, and determines a statistical loss measure (per annum). The basis for this is the finding[3] that the companies surveyed reported an average of three supply chain disruptions per year. For this study, we reduced this number to the reporting of "serious disruptions", such that we assume a probability of occurrence for a significant disruption of 0.67 per year.

The approach to determining ROI in this study deliberately does not address the option of actuarial determination using "value at risk". The reason for this is that this study follows an easily applicable and yet professional as well as demonstrable derivation of the ROI of an SCRM investment.

A fictitious industrial company, ROI Inc. is used as a reference for a concrete representation of the ROI. ROI Inc. has revenue of 200 million USD, employs 20 staff in procurement and logistics, and plans to monitor the 2nd-tier supply chain of its top 100 suppliers. Insurance coverage to an annual value of 1 million USD exists, and this sum is guaranteed as a lump sum within the framework of other insurance. A supply chain disruption is estimated to cause losses of approx. 25,000 USD per hour (penalties, idle time costs, increased logistics costs for replacement provisioning, etc.) The calculation of personnel costs for procurement and logistics staff is based on an hourly rate of 50 USD. The annual new A-category spend is on average 200,000 USD. In addition, ROI Inc. accesses current reinsurance data for geocoded determination of natural hazard risks at a cost of 100,000 USD per annum. Based on these listed parameters, the ROI potential for ROI Inc. will be assessed in the study. The ROI Calculator developed in this connection, which is freely available, also enables any interested company to conduct a complete individual appraisal of its own ROI. Additional information in this regard, as well as the details for a free download can be found in Section 6 "Template for ROI Calculation".

[3] The study "Can You Afford the Risk?" from Supply Chain Insights LLC (2014) reports an average of 3 supply chain disruptions per company surveyed.

4

Goals of Supply Chain Risk Management (SCRM)

Based on the various company objectives (price leadership, quality leadership, etc.), motivations and goal-setting in SCRM projects are also different. Typical core goals when initiating SCRM are:

Core goals

- Ensuring revenue by avoiding supplier disruptions
- Protecting the company image by adhering to ethical, social and environmental standards in the supply chain
- Protecting the company from criminal penalties by adhering to regulatory guidelines and requirements
- Defending profit margins through resistant, efficient and flexible supply chains

These core aims are accompanied by a number of ancillary goals such as simplified certification procedures (ISO 28000, 28001) or optimized insurance benefits for operational disruption policies (extent of cover, costs). Support for company-internal GRC guidelines (Governance, Risk & Compliance) or the requirement for operating best-in-class management of the supply chain are also drivers for investing in SCRM.

5

Return On Investment (ROI) for SCRM

5.1 ROI Through Automated Acquisition of Information

A key component of SCRM is the identification and evaluation of the risk situation in the supply chain. The supply chain elements to be evaluated (risk objects) are all in the supply chain:

- **Suppliers involved**
- **Logistics hubs used (harbors, warehouses, etc.)**
- **Affected countries**

Each of these risk objects has a number of individual risks such as insolvency, relocation of premises, ethical breaches, sanctions (supplier risks), strikes, pandemics, natural hazards (location risks) or infrastructural, macro-economic as well as political risks (country risks). To determine the risk status, individual indicators ("sensors") must be evaluated and continually monitored for changes: For example, to determine a supplier plant's exposure in terms of natural hazards, information and change data about environmental and natural details for the plant's location are required, such as risk of earthquake or flooding, etc. One of the world's largest industrial groups estimates the work effort saved for information research compared with a solution that automates the provision and analysis of information to be 4.35h per month (this corresponds to 1h per week) per commodity manager/lead buyer and logistics manager. This effort saved can be determined from the obsolete initial research on the risk situation during award decisions using a number of tools as well as web research, and continual monitoring of individual risks via search engine alerts and topic-specific websites such as the Global Disaster Alerting & Coordination System (www.gdacs.org). The hourly rate used in this organization is 50.00 USD.

In addition to this purely arithmetical approach, another qualitative issue needs to be considered: Bearing in mind the load of daily operations, is there in fact a continual process in ROI Inc. for actually performing this essential manual research? Or, in reality, is this research performed in a much more lax manner? Is it the case that relevant risk trends and events are perhaps consequently identified considerably later than they should be, as manual data research is not one of the top priorities and tasks?

ROI analysis result based on the automation of data procurement and evaluation for ROI Inc.: For each procurement and logistics employee involved, an annual figure of 1,958.00 USD is saved, which amounts to 39,150.00 USD in total[4]. ROI type: saving. Alternatively, around 100 working days can be allocated for value-creating activities.

5.2 ROI Through Supply Chain Visibility

Transparency across the entire supply chain and, as a result, the identification and evaluation of the risk situation for sub-suppliers as well, is a significant part of SCRM. The reason for this is obvious, and was clearly underpinned in 2013 by the Business Continuity Institute[5]: 42 % of all supply chain disruptions stem from tiers below the immediate suppliers. This issue is even more dramatic when seen against the background that 75 % of the companies have no transparency in the sub-structures of their supply chains. An obvious reason is the high degree of manual effort required to identify the current situation and the current changes in the 2nd-tier supply chains, and to incorporate these into risk monitoring[6]. The effort in a company – even where this process is well supported by electronic voluntary supplier information – is estimated at approximately 30 minutes per year and supplier for

- **Dispatch or activation of the questionnaire (e. g. via voluntary supplier information)**
- **Follow-up on unanswered questionnaires**
- **Follow-up on incomplete or incorrect answers**
- **Transfer of the answers (sub-tier supplier master data, logistics hubs, data on recovery timeframes, etc.) into the risk monitoring process**
- **Request for individual risk data sources (credit ratings, geo risk profiles, CSR information, sanctions tests, country risks, etc.)**

In 2nd-tier identification, if one uses a conservative estimate of an average of 5 sub-suppliers, the effort for 100 1st-tier suppliers alone is calculated at 300 working hours[7]. As these tasks are typically performed by lead buyers, commodity managers and/or logistics experts, an hourly rate of 50.00 USD should follow on from „rate of": rate of 50.00 USD can be expected. This then means that the work effort in purely monetary terms for ROI Inc. to identify 2nd tiers, follow-up activities, updating and risk data queries is 15,000.00 USD per annum. However, if the company instead makes use of an expert-supported, software-based Supply Chain Identification Service, these costs can be reduced by an average of 58 %. In concrete terms, this means an annual saving of 8,700.00 USD in our example. Alternatively, this regained working time (300 hours per annum) can be used by procurement and logistics management for value-creating activities.

ROI analysis result based on the use of an expert-supported and tool-based Supply Chain Identification Service for ROI Inc.: annual saving of 8,700.00 USD. ROI type: saving.

[4] With an automation level of 75 %.
[5] "Supply Chain Resilience" (2013) – Business Continuity Institute.
[6] "No time" is the number 1 argument for lack of supply chain transparency – Source: Zurich Supply Chain Review "The Weakest Link" (2012).
[7] 100 1st-tier suppliers + 500 2nd-tier suppliers x 0.5h identification & maintenance effort per data record = 300h p.a.

5
Return On Investment (ROI) for SCRM

5.3
ROI Through Lower Costs for External Premium Information

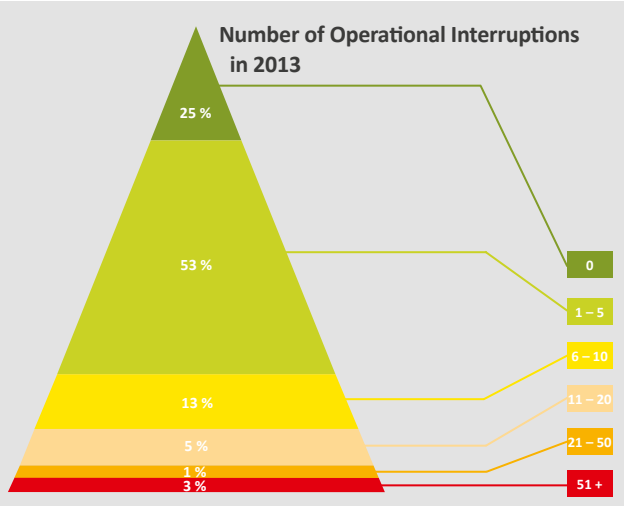
Access to data sources from third-party suppliers is often not cost-effective for individual companies, first as this access is associated with high costs, and second as individual IT systems must be adapted and interfaces created and maintained. By contrast, standard SCRM solutions permit scalability effects that allow the access and use of this premium data under significantly more favorable conditions. Access to reinsurers' databases, which provide extremely detailed risk assessments about different natural hazards for any geo coordinates can cost a six-figure USD amount, for example – this is for a single year's access. Consequently, it is only large corporations or insurance companies that can afford this information. SCRM providers such as riskmethods GmbH offer customers live access to exactly this data, which allows smaller and medium-sized companies to also receive exact estimates of natural hazard risks for their supplier locations, for important logistics hubs in their supply chains as well as for their own locations, and this at a fraction of the costs mentioned above. Significant cost benefits are also available in the area of creditworthiness data or sanctions testing, which are impossible to achieve to the same extent, even by an SCRM solution developed in-house.

ROI analysis result for ROI Inc.: When taking into consideration publicly available price information dated October 2014 from riskmethods GmbH for example, annual costs of this ROI option are reduced by 90 %, thereby generating savings of 90,000.00 USD per year.

ROI type: saving[9]. The laborious research into geo coordinates, querying of risk exposure and documentation of results, which has up till now been a manual process, is also obsoleted and contributes to increased usage of information.

5.4
ROI Through Time Advantage

Besides a high level of efficiency, automated procurement of risk information offers another benefit: an almost real-time early warning system. One of the 10 largest automobile component suppliers has calculated the time advantage as a result of automated early warnings to be 1.5 days[10]. This means that in the event of a catastrophe, the crisis teams can initiate measures to overcome and limit the resultant damage 1.5 days earlier. In the case of automobile manufacturers, penalties for component suppliers in the event of production interruptions of 200,000.00 USD per hour are not unusual, whereby ROI Inc. works on significantly lower penalties of 25,000.00 USD per hour in the ROI Calculator. The topic is extremely relevant: According to the study "Supply Chain Resilience 2013 Survey" by the BCI (Business Continuity Institute), 75 % of the 519 international companies surveyed reported at least one operational interruption in 2013.



Assuming that responding to a crisis 1.5 days earlier can under optimal circumstances completely prevent a supply disruption at the customer, penalties of around 600,000.00 USD per crisis situation can be avoided (assumption: shift operation OEM 16h/day, 25,000 USD penalty/hour). Taking into account the probability of occurrence, this absolute value is again relativized for determining the ROI: From a statistical perspective, an event that actually results in penalty payments occurs twice in three years, that is, 0.67 times per year[11]. In addition, one can also not assume that every operational interruption also results in a supply disruption at the company's own customers. Consequently, an assumption is made for calculation purposes that this only occurs during every 2nd crisis situation. As a result, avoidance of penalty payments amounts to 200,000.00 USD per crisis situation.

ROI for ROI Inc.: 200,000.00 USD per annum. In addition, potential is increased, as this assessment contains no idle time costs due to production stoppage in the company's own manufacturing line (electricity, personnel, maintenance, etc.) ROI type: saving (dependent on crisis situation, however).

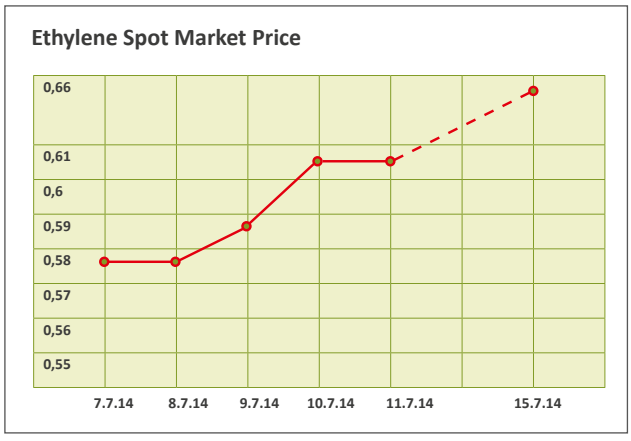
[8] The efficiency savings recorded are in the range from 37 % – 70 % time savings. Source: own research.
[9] Only applicable for an ROI validation to the extent that appropriate sources are already being used.
[10] Internal ROI evaluation of a globally active riskmethods customer. Sector: industry/manufacturing.
[11] Details on determining the annual ROI in the case of damages due to crisis situations are provided in Section 3 "Process Model of the Study and Definition of Terms"

5

Return On Investment (ROI) for SCRM

5.5 ROI Through Price Containment in a Crisis Situation

Besides the time advantage, an early warning system provides an opportunity to minimize additional costs that arise as a result of crisis situations. This includes costs arising from personnel assigned to the crisis team, increased logistics costs for ensuring adherence to deadlines and quantities (e.g. charter flights) as well as costs resulting from replacement provisioning for outstanding deliveries. **A concrete example:** On Monday, July 7, 2014, the riskmethods GmbH Supply Risk Network sounded an alarm at all its affected customers regarding the failure at the Chevron Phillips chemical plant in Port Arthur (Texas), one of the world's largest locations for the manufacture of ethylene, and issued a warning about a worldwide shortage. Ethylene is the most important component in the petrochemical/plastics industry. The price on the ethylene spot market at this point in time was 0.5775 USD/lb. It took around 72 hours for knowledge about the significance of this incident to trigger the first price reactions on the spot market. The price initially rose by around 5 % to 0.60500 USD/lb., and then reached an 18-month high of 0.66000 USD/lb. on July 15. The early warning mechanism provided ROI Inc. the opportunity to cover its own ethylene requirements before other market players drove the price up by 16 % within one week[12].



Here as well, prevention of price increases can be indicated on a yearly basis due to the use of the statistical probability of occurrence of crisis situations (2 in 3 years)[13] .

ROI per crisis situation for ROI Inc.: prevention of price increases of up to 16 % related to the short-term demand to be met or 32,000.00 USD. The statistically determined cost containment is calculated at 21,333.00 USD per annum. ROI type: price containment in a crisis situation.

5.6 ROI Through Insurance

Besides the real-time response to disruptions in the supply chain, the existing risk information on "latent" risks and current trends should be analyzed to draw the correct conclusions and to implement adequate risk-avoidance measures. This includes supplier development measures, setup of alternative procurement sources, optimization of warehousing, insurance, modified procurement practice (risk as procurement criterion), changes in contractual liability clauses and many other activities. Prevention promises the greatest benefit but is also the most difficult to quantify: Because how can a loss event that does not occur due to prevention (and its potential extent) be measured?

Increased transparency through the risk structures along the supply chain helps improve the insurance coverage (extent, exclusions, etc.) and conditions in risk placement in the insurance market[14]. On the one hand, the insurance providers can no longer simply reject the assumption of risk based on the lack of risk transparency and impossible calculation of cumulative risks for example – this is a common problem in companies that prefer requesting appropriate cover for Contingent Business Interruption (CBI). It is not without reason that specialist insurers such as Allianz or Zurich, as well as brokers with their own supply chain risk management experts (e. g. MARSH Risk Consulting) support companies by means of initial comprehensive risk assessments of their supply chains. On average, approx. 0.12 USD insurance premium per 100.00 USD of cover is due for CBI insurance[15]. For a manufacturing company with annual insurance coverage of up to 20 million USD, this equates to an annual insurance premium of 24,000.00 USD. According to the results of studies[16] by Sourcing Innovation, companies with demonstrable supply chain visibility can reduce the insurance rate for CBI insurance by up to 50 %. This is a 50 % saving – per year.

ROI for ROI Inc.: 12,000.00 USD per annum[17] through a premium reduction of up to 50 %. ROI type: saving. It should be noted here that the possibility also exists that insurance companies may be prepared to additionally extend the cover because of the transparency in the supply chain and thereby increase the risk protection, partly on a cost-neutral basis.

[12] In the ROI Inc. case study, the value of the short-term demand is 200,000.00 USD
[13] Details on determining the annual ROI in the case of damages due to crisis situations are provided in Section 3 "Process Model of the Study and Definition of Terms".
[14] Dr. Georg Bräuchle, MD of Marsh Deutschland GmbH.
[15] Sourcing Innovation, "The ROI of Supply Chain Resiliency" (Nov. 2013).
[16] Sourcing Innovation, "The ROI of Supply Chain Resiliency" (Nov. 2013).
[17] The ROI Calculator uses a successive increase in this ROI as the basis, as an assumption can be made that not all insurances are concluded in the first year with new conditions.

5
Return On Investment (ROI) for SCRM

5.7
ROI Through Advanced Sourcing

The Aberdeen Group created the term "Advanced Sourcing" as an expression to denote modern methodologies and tools as part of strategic purchasing. This includes in particular electronic procurement processes (RfI, RfX, auctions), management of product groups and strategic suppliers, spend analyses and contract management[18]. Improved transparency on the one hand allows for setting up of resistant supply chains, and on the other for considering risk-relevant information as a precursor to purchasing decisions. One of the world's largest automobile manufacturers always includes suppliers' risk scores into an award decision as well as location risk scores for individual suppliers' plants. This can generate immense benefits: In a 2012 study[19] conducted over an observation period of 5 years, the Federation of European Risk Management Associations (FERMA, Brussels) found that 28 % of companies with excellent risk management demonstrated a high EBITDA growth of >10 % p. a. – compared to only 16 % of the companies with rudimentary risk management processes. Unfortunately the study did not investigate the direct benefit contribution in detail, and there is consequently no clear evidence as to exactly what percentage supply chain risk management contributed to these effects. However, other studies provide an extremely precise picture of the value-add of supply chain risk management as a component of Advanced Sourcing: On average, the annual influenceable spend for primary materials in manufacturing companies stands at approximately 6 % of revenue[20]. Aberdeen Group puts the total cost of ownership savings of Advanced Sourcing at an industry average of 8 %[21]. Assuming that supply chain transparency generates only a 10 % portion (in addition to activities such as aggregation of requirements, e-sourcing, and management of suppliers, contracts and goods categories) of the 8% savings mentioned (that is, 0.8 % savings on the influenceable spend), this results in a saving of 0.048 % – related to the revenue of a manufacturing company.

ROI for ROI Inc.: up to 96,000.00 USD savings per annum (corresponds to 0.048 % of revenue)[22]. Type: savings.

5.8
ROI Through Avoidance of Revenue Shortfalls

Disruptions in supply chains often unavoidably lead to delays in revenue or even to complete revenue shortfalls. If production does not receive the necessary materials, customer orders cannot be fulfilled in time or possibly not at all. Whether this results in a complete revenue shortfall or not also depends on the sector. For example, the service industry cannot maintain a "warehouse" to buffer possible production stoppage of a call center, for example. For the food industry, a delay in supply means a possible total loss, based on spoilt foodstuffs that have been in the supply chain for too long. However, all other sectors in which customer-specific products are generated, some of which are also linked to contractual framework parameters with withdrawal rights, can suffer complete revenue shortfalls as a result of total stoppages as well.

For example, after the floods in Thailand, Canon lost 607 million USD in revenue in its printer business. Nikon reported a revenue reversal of 786 million USD. Intel announced a revenue slump in the 4th quarter of 2011 from 14.7 to 13.7 billion USD based on supplier stoppages – caused by the floods in Thailand, which in turn resulted in missing electronic components for production. Hewlett Packard reported a drop in revenue of a similar magnitude (1 billion USD).

According to an investigation by the Business Continuity Institute, larger supply chain disruptions cause 9 % of revenue losses[23]. The threat of these revenue losses should be avoided, as this has a major influence on market shares, customer satisfaction, financing, and finally on shareholder value. Assuming that two supply chain disruptions occur within three years, of which in turn only every second event leads to actual loss of revenue, the threat of loss of revenue per year is calculated as 3 % of total revenue.

ROI for ROI Inc.: avoidance of revenue shortfall of 6 million USD per annum[24]. ROI type: avoidance

[18] Aberdeen Group, "Advanced Sourcing – Maximizing Savings Identification" (2012).
[19] FERMA Benchmarking Survey results in a nutshell – November 29, 2012 - Author: Florence Bindelle.
[20] 100 % revenue, of which approx. 60 % managed spend, of which 50 % primary material, of which approx. 20 % p.a. influenceable, resulting in 6 % of revenue.
[21] Aberdeen Group: "Advanced Sourcing – Maximizing Savings Identification" (2012).
[22] The ROI Calculator uses a successive increase in this ROI as the basis, as an assumption can be made that not all insurances are concluded in the first year with new conditions.
[23] Zurich Versicherung "Strategic risk: do not forget your supply chain!".
[24] Statistical probability of occurrence: 0.67. Annualized: 6 million USD. Details for determining annual ROI for crisis-dependent damage are listed in Section 3 "Process Model of the Study and Definition of Terms".

5

Return On Investment (ROI) for SCRM

5.9
ROI Through Protection of Reputation

> "It takes 20 years to build a reputation and five minutes to ruin it."
> Warren Buffet

Supply chain risks are not limited to measurable and material damages to the company process only. Besides quality, ability to deliver and price, the company image is an important perception and success factor. The good reputation of a company can quickly be damaged if increased requirements in terms of sustainability, business ethics and CSR in the supply chain are not adhered to due to improper behavior by business partners. Greater information transparency (Internet, digitalization) means that news such as this travels around the globe almost instantaneously. For example, poor working conditions due to faulty ventilation in a production area led to a dust explosion at a Chinese automobile supplier in August 2014 that resulted in the deaths of 70 workers. Immense media pressure forced General Motors management to issue a public statement, as this operation is a sub-supplier to GM. This case is noteworthy in that there is no contractual relationship between GM and this company. However, the public expects an indirect influence by the automobile manufacturer on its suppliers and sub-suppliers, to implement and maintain ethical and environmentally friendly minimum standards. CIRANO[25] researched indices that allow a quantitative assessment of the evaluation of reputation, including by means of incidents that damage a brand. The result of this analysis[26] was that every reduction in the Forbes Image Index by just a single point for companies listed on the stock exchange causes a 2.82 % reduction in company goodwill. Prominent examples were quoted of supply relationships at Nestlé (palm oil supplier destroys orangutan habitats), SNC Lavalin (dubious bookkeeping) or Apple (prohibition on suicides and poor working conditions at the supplier Foxconn).

ROI for ROI Inc.: avoidance of 3,760,000.00 USD damage to reputation per annum. ROI type: avoidance[27].

[25] Center for Interuniversity Research and Analysis on Organization.
[26] Study: "Corporate Reputation: Is Your Most Strategic Asset at Risk?" CIRANO (2012).
[27] Statistical probability of occurrence: 0.67. Annualized: 3,760,000 USD. Details for determining annual ROI for crisis-dependent damage are listed in Section 3 "Process Model of the Study and Definition of Terms".

6

Template for ROI Calculation

This study establishes understandable ways for professional derivation of return on investment through investing in supply chain risk management. We consider this approach to be a fully-fledged and practical alternative to “value at risk” determination, which is extremely time-consuming and costly. We also transfer the results into a freely available calculation template so as to offer companies an ROI methodology for assessing investments in supply chain risk management in a way that is easy to manage.

The following details provide input parameters:

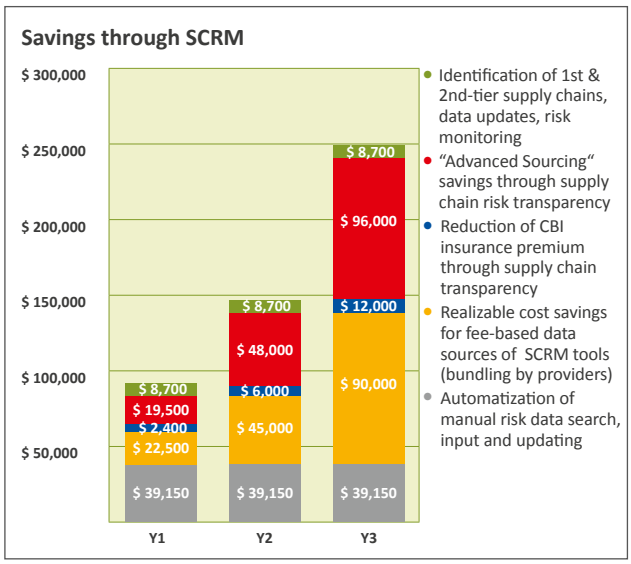
- Number of employees in procurement & logistics with (partial) risk management responsibility
- Imputed hourly rate/employee
- Costs of operational disruption per hour (penalties, increased logistics costs, idle time, etc.)
- Average A-category spend (p. a.)
- Amount of coverage of CBI insurance p. a. (not premium)
- Revenue
- Goodwill/market capitalization
- Suppliers to be monitored (1st tier)

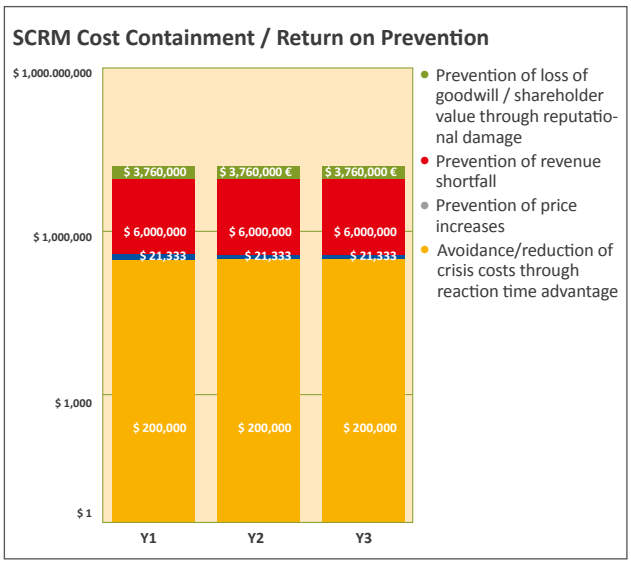
Parameters

Customizable ROI leverage (cf. Section 5. 1 to 5. 9) enables mapping of individual, company-specific initial situations. For instance, where a company does not perform a risk analysis on exposure to natural hazards of supply chain locations (suppliers' plant locations, logistics hubs, etc.) it is not possible to calculate savings through future use. Leverage such as this can therefore also be set to n/a (not applicable) (cf. figure) in order to correctly determine actual savings.

Leverage for Savings & Cost Containment	Applicable (Y/N)
Automatization of manual risk data search, input and updating	Y
Realizable cost savings for fee-based data sources of SCRM tools (bundling by providers)	Y
Reduction of CBI insurance premium through supply chain transparency	Y
"Advanced Sourcing" savings through supply chain risk transparency	Y
Identification of 1st & 2nd-tier supply chains, data updates, risk monitoring	Y
Avoidance/reduction of crisis costs through reaction time advantage	Y
Prevention of price increases	Y
Prevention of revenue shortfall	Y
Prevention of loss of goodwill / shareholder value through reputational damage	Y

By means of the entries above, the annual ROI can be derived according to the explanations provided in Sections 5. 1 to 5. 9 inclusive. As a general rule, not all savings will achieve 100 % results right from the start. Current insurance policies cannot be terminated ad-hoc, or Advanced Sourcing activites require a start-up time until they can be applied to a large proportion of the spend. For this reason, the impact is extrapolated according to topic for the first two years of SCRM application in the ROI calculation, showing a successive increase on an annual basis[28]. As a distinction is made in ROI determination between actual savings (reduction of effort/costs compared with the status prior to establishing a software-based SCRM methodology) and cost avoidance, both ROI types are displayed separately in the results. It is up to the user to select which of the ROI types determined are included in the final analysis.





[28] Impact of Advanced Sourcing: 20 % in year 1, 50 % in year 2, 100 % in year 3. Impact of better CBI insurance premiums: 20 % in year 1, 50 % in year 2, 100 % in year 3.

7

Case Study: ROI Determination for a Medium-sized Company

A specific use case is as follows: A manufacturing company with annual revenue of 200 million USD and 20 employees in procurement and logistics with risk management responsibility has so far been performing risk management without the support of tools. To date, risk managers have been using information on credit ratings, voluntary supplier information and web research for assessing the risk situation of suppliers during the phase-in stage. The quality, procurement & logistics departments perform on-site audits at all top 100 suppliers every 1 to 2 years, depending on the supplier class. Templates for voluntary supplier information are used to attain sub-tier information (incomplete due to lack of time on the part of lead buyers and the high degree of manual effort) and to confirm CSR conformity on the part of suppliers. Information on location risks at supplier plants and supply chain hubs is not available. The insurance department has up to now only obtained CBI lump sum coverage in the amount of 20,000,000.00 USD p.a. due to lack of transparency along the supply chains. A larger customer calls for supply chain risk management after an audit – the investment decision taken during the decision-making process is based on an ROI analysis.

Based on the case study, the following entries and practical levers are defined:

Input Description	Input
Number of employees in procurement & logistics with (partial) risk management responsibility	20
Imputed hourly rate/employee	$ 50
Costs of disruption per hour (penalties, increased logistics costs, idle time etc.)	$ 25,000
Average A-category spend (p. a.)	$ 200,000
Amount of coverage (not premium) of CBI insurance p. a.	$ 20,000,000
Company sales	$ 200,000,000
Goodwill/market capitalization	$ 200,000,000
Number of suppliers to be monitored (1st tier)	100

Leverage for Savings & Cost Containment	Applicable (Y/N)
Automatization of manual risk data search, input and updating	Y
Realizable cost savings for fee-based data sources of SCRM tools (bundling by providers)	Y
Reduction of CBI insurance premium through supply chain transparency	Y
„Advanced Sourcing“ savings through supply chain risk transparency	Y
Identification of 1st & 2nd-tier supply chains, data updates, risk monitoring	Y
Avoidance/reduction of crisis costs through reaction time advantage	Y
Prevention of price increases	Y
Prevention of revenue shortfall	Y
Prevention of loss of goodwill / shareholder value through reputational damage	Y

Savings:

Even for conservative estimates, the result shows that an investment of up to 91,950.00 USD works out to be completely budget neutral in the first year (i.e. return through savings in year 1). Down the line, the ROI increases by an additional 50 % to 146,850.00 USD in the second year as a result of the stronger effects of Advanced Sourcing activities and the options for renegotiation of insurance policies, for example. In year 3 the full benefit amounts to savings of 245,850.00 USD per annum.

Cost avoidance:

Furthermore, additional security is achieved as a result of the investment, through risk avoidance. Statistically, for 2 crisis situations in a period of 3 years, preventive measures can provide the maximum degree of protection and save the company millions in terms of losses resulting from operational disruption and damage to corporate image.

Leverage for Savings	Y1	Y2	Y3
Automatization of manual risk data search, input and updating	$ 39,150	$ 39,150	$ 39,150
Realizable cost savings for fee-based data sources of SCRM tools (bundling by providers)	$ 22,500	$ 45,000	$ 90,000
Reduction of CBI insurance premium through supply chain transparency	$ 2,400	$ 6,000	$ 12,000
"Advanced Sourcing" savings through supply chain risk transparency	$ 19,200	$ 48,000	$ 96,000
Identification of 1st & 2nd-tier supply chains, data updates, risk monitoring	$ 8,700	$ 8,700	$ 8,700
Total	**$ 91,950**	**$ 146,850**	**$ 245,850**

Leverage for Prevention	Y1	Y2	Y3
Avoidance/reduction of crisis costs through reaction time advantage	$ 200,000	$ 200,000	$ 200,000
Prevention of price increases	$ 21,333	$ 21,333	$ 21,333
Prevention of revenue shortfall	$ 6,000,000	$ 6,000,000	$ 6,000,000
Prevention of loss of goodwill / shareholder value through reputational damage	$ 3,760,000	$ 3,760,000	$ 3,760,000
Total	**$ 9,981,333**	**$ 9,981,333**	**$ 9,981,333**

8

Summary

Gartner Group categorized the global demand for SCRM solutions as “extremely important” in their **“Strategic Roadmap for Supply Chain Risk Management (SCRM) Solutions”**[29] study, and considered the available solutions as an inadequate “patchwork”. A requirement exists for approaches that assist companies in covering the key criteria for a professional **SCRM solution.** The most critical parameters are listed as:

- Comprehensive methodology (bandwidth of risks covered)
- Enabling of operative and preventive risk management
- Support for cross-functional use cases from Procurement, Logistics, Insurance department, Compliance, Corporate Social Responsibility, etc.
- Integration of company data from external structured and unstructured data sources

Parameters

Over 90 % of companies today are still not in a position to demonstrate the approach described by Gartner, or adapted alternatives, in a manner that is supported in terms of methodology, organization, process and software[30].

However, 84 % of managers now consider the topic of supply chain risk management to be top priority[31]. This clearly demonstrates that this has now become a conscious requirement, and that investments in **SCRM solutions** will enjoy high priority in the long term.

The relevance of SCRM was also underscored by the Accenture Global Operations Megatrends study **“Don’t Play it Safe When it Comes to Supply Chain Risk Management”**, released in June 2014. Accenture questioned over 1000 companies in the USA, Europe and Asia on their ROI experiences as regards the topic of supply chain risk management. Those surveyed included representatives from a wide range of sectors: industry, telecommunications, banking, retail, medical technology, chemicals, energy, consumer goods and high-tech products. **The results are clear:** Companies whose top management consider supply chain risk management to be “Very important” and “live” a methodology using the support of tools on an organization-wide basis achieve an ROI of over 100 %. This means that an investment in SCRM pays for itself within 12 months, and is therefore budget neutral.

Determining ROI represents an important aspect when deciding on **supply chain risk management solutions**. By means of this study and the ROI Calculator, we offer a pragmatic, numbers-based option for determining ROI. We are acutely aware that the company-specific initial situation, the sector in which the company operates and other parameters must be taken into consideration. As a result, the **ROI Calculator** is kept in an editable format. This means that the external share of the value-add transferred to suppliers can be adjusted in the ROI template, for example, by individual changes to the ROI calculation formula. *www.riskmethods.net/en/roi*

Based on the study and the **ROI Calculator**, a tailored return on investment calculation that can be evaluated in monetary terms can be performed for the company. Besides the benefit of this evaluation in monetary terms, a number of qualitative parameters also support decision-making. Numerous aspects, such as the following, need to be taken into consideration here: company-wide availability of risk transparency across all departments for more efficient coordination in a crisis situation, cross-functionally aligned supplier development measures or optimized award decisions, taking into consideration total cost of ownership and risk profile information.

By means of this ROI study we hope to be able to provide pragmatic support for decision-making regarding **supply chain risk management**. We would appreciate your thoughts, experiences, suggestions or simply your feedback of any nature.

Managing Director riskmethods

[29] Gartner Group “Strategic Roadmap for Supply Chain Risk Management (SCRM) Solutions” (2012) by Noha Tohamy.
[30] Own market research by riskmethods; approx. 300 companies surveyed in Europe, USA and Asia Pacific.
[31] Accenture: “Don’t Play it Safe When it Comes to Supply Chain Risk Management” – “Leaders” consider SCRM to be Important (23 %) and Very important (61 %).

About eckseler consult

Dr. Hugo Eckseler has more than 30 years of experience in procurement and supply chain management in leading international companies, and is an active member of the Procurement Leaders Global Intelligence Network and the German Association Materials Management, Purchasing and Logistics. In 2010 he founded his own management consultancy.

About riskmethods

riskmethods provides companies with a comprehensive **supply chain risk management solution** for proactive monitoring and assessment of risks in the supply chain. An early warning system for potential risk ensures that proactive steps can be taken to avoid supply disruption, enforce compliance and protect the corporate image. The SaaS solution **"Social Supply Risk Network"**, which was developed in Germany, combines state-of-the-art technology with cutting-edge provision of risk intelligence, to establish a leading standard in supply chain risk management.

Version: November 2014

Dr. Hugo Eckseler
eckseler-consult
Heimdallstraße 8
51107 Cologne
Phone: +49 (0) 221-8 29 17 10
mail@eckseler-consult.de
www.eckseler-consult.de

Heiko Schwarz
riskmethods GmbH
Orleansstraße 4
81669 Munich
Phone: +49(0) 89-9901 648-0
info@riskmethods.net
www.riskmethods.net

riskmethods