Assessing Performance Of Supply Chain Risk Management Programmes – A Tentative Approach

Berg, Eva; Knudsen, Daniel; Norrman, Andreas

Published in:
International Journal of Risk Assessment and Management

2008

Link to publication

Citation for published version (APA):

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
Assessing performance of supply chain risk management programmes: a tentative approach

Eva Berg

Department of Industrial Management and Logistics,
Lund University,
P.O. Box No 118,
Lund SE-221 00, Sweden
E-mail: eva.berg@tlog.lth.se

Daniel Knudsen

Sony Ericsson Mobile Communications AB,
Nya Vattentornet, Lund SE-221 88, Sweden
E-mail: daniel.knudsen@sonyericsson.com

Andreas Norrman*

Department of Industrial Management and Logistics,
Lund University,
P.O. Box No 118,
Lund SE-221 00, Sweden
E-mail: andreas.norrman@tlog.lth.se
*Corresponding author

Abstract: This exploratory study provides initial directions about how risk management programmes could be assessed in a supply chain setting and discusses how such a measurement system could be designed. Measures are needed both for the management to evaluate the success of actions taken in supply chain risk management, as well as for the (supply chain) risk manager to communicate the value of his work. A number of indicators could show whether it is successful, for example, in reducing risk consequences, addressing the right risk sources and developing the right risk management processes. A central question within assessing risk management programmes is how to link risk management activities to outcomes. A tentative framework, based on a quality model, is proposed to assess the performance of supply chain risk management work. It highlights the importance of trying to capture both the capabilities of supply chain risk management and the results of the work.

Keywords: supply chain risk management; risk management programmes; performance measurement; assessment.

Biographical notes: Eva Berg is a Lecturer and a PhD student at Lund University, Sweden. Her research interest is connected to risk sharing, contracts and relationships between companies working with Vendor Managed Inventory. She received an MSc in Industrial Management and Engineering from Linköping University. From 1993 until she joined Lund University in 2003, she worked at Hewlett Packard, Ericsson and Bergendahlsgruppen in various logistics positions, including Logistics Director.

Daniel Knudsen is working as a Change Agent within Sony Ericsson Mobile Communication’s Sourcing Department, where he manages the Sourcing Academy, a global competence development programme. He is also involved in sourcing risk management, global process development and other various change activities. Prior to his industry career, he received a PhD at Lund University in the field of procurement and e-business.

Andreas Norrman is an Associate Professor at Lund University, Sweden. Currently, he is part of the management team setting up the Swedish National Excellence Centre in Logistics Next Generation Innovative Logistics (NGIL) at Lund University. He received his PhD in Logistics in 1997 from Linköping University, Sweden. After that, he worked as a management consultant at A.T. Kearney with supply chain management and sourcing issues. Since 2000, he has worked at Lund University, but also holds an adjunct position at the Turku School of Economics and Business Administration in Finland. He has published articles in many different international journals.

1 Introduction

1.1 Background and purpose

In many industries, especially those moving towards longer supply chains (e.g. due to outsourcing) and facing increasingly uncertain demand as well as supply, the issue of risk handling along the supply chain is an important topic. The leaner the supply chains become, the more likely it is that uncertainties, dynamics and accidents in one link affect the other links in the chain. Souter (2000) stresses that companies should focus not only on their own risks, but also on risks in other links in their supply chain. The core of supply chain risk management is to understand, and try to avoid, the devastating ripple effects that disasters or even minor business disruptions can have in a supply chain.

Consequently, management has increased its efforts to proactively manage risk and risk sources. Initial risk management work has concentrated on risk analysis/identification, risk assessment, risk management/treatment activities and business contingency planning (see e.g. Normman and Jansson, 2004; Zsidisin et al., 2000). But so far we have found little attention devoted to measuring the performance of the supply chain risk management work. We wonder what the indicators could be that supply chain risk management work is successful, for example, in reducing the risk consequences, addressing the right risk sources and developing the right risk management processes. From a business perspective, profitability is the key measure, so the cost of risk mitigation must be balanced against potential risk costs. Ritchie and Brindley (2004)
highlight the area of metrics, and suggest that profit performance must be combined with the resulting risk inherent in the organisation. One dilemma for risk management work in general is the difficulty of linking efforts to results, because if no accident occurs, is that due to proactive risk management work or is it pure luck? Hence, measures are needed both for management to evaluate the success of actions taken in supply chain risk management, as well as for the (supply chain) risk manager to communicate the value of his work. A central question within assessing risk management programmes is how to link risk management activities to outcomes. The assessment of the risk management work is by no means trivial, for many reasons:

- Risk management programmes are an amalgam of proactive and reactive activities, and success is spelled ‘no surprises’ or ‘no tangible results’ such as accidents etc. But if no accidents occur, is that because of successful risk management work or is it just pure luck that nothing went wrong? All in all it is difficult for the risk manager to provide evidence of his achievements.

- Risk management work is mainly connected to costs, without many tangible revenues – one issue is hence to balance the cost of risk management work with the positive, but often intangible, impact of that work.

- If risk management work is lagging behind, the awareness of risk sources and their consequences could initially be very low. At the beginning of a risk management programme, performance indicators such as number of risk sources or risk costs could hence increase dramatically, indicating poor performance, whereas instead it should be seen as positive that they are identified. But later in a risk management programme those performance indicators should preferably decrease (because risk sources are better managed) – leading to a measurement problem ‘over time’.

- Taking a supply chain perspective, the issue will be to measure not only the performance internally, but also the achievements of risk management work in a supply chain.

The purpose of this exploratory study is to give initial directions about how risk management programmes could be assessed in a supply chain setting and to discuss how such a measurement system could be designed.

After a short description of the research process, we summarise our theoretical framework relying on for example, supply chain risk management, risk management assessment, measurement systems and quality assurance. In particular, some models regarding assessment of risk management are discussed. Then insight from three exploratory case interviews and a focus group interview will be presented. Based on this, a framework is presented that gives initial directions assessing risk management programmes in a supply chain context.

### 1.2 Approach and method

As the study is meant to give initial directions about assessing the performance of risk management programmes, it approaches the subject from several angles.
Firstly, a literature search was conducted where three major bodies of knowledge were investigated: supply chain risk management and quality management, risk management assessment and performance measurement (the quality management oriented literature has been applied for risk issues by for example, Lee and Wolfe (2003) and Peck (2003)). This theoretical framework was developed with the aim of describing how such a measurement system could be designed.

Secondly, three exploratory case studies were conducted in order to acquire data and experiences from companies regarding their approach to measuring the performance of risk management programmes, preferably but not necessarily in supply chain settings. The reason for looking into areas other than supply chain risk management was our belief that it could be very difficult to find and target organisations that excel at both supply chain risk management and the assessment of risk management processes. The case studies were conducted as semi-structured interviews with an interview guide (Appendix A).

Finally, focus group interviews were carried out as a small workshop. Eight senior professionals within risk management, and supply chain management or production, participated in a full-day workshop. The workshop was hosted by one of the companies (a big global high-tech company) and they participated with four persons representing four different organisational units covering corporate risk management, supply chain risk management (staff position within a unit responsible for all logistics) and risk managers working at two different plants. Other risk managers from a major listed steel producer and the largest health care organisation in Sweden (more than 20,000 employees) participated, as well as one consultant within risk management and one associate professor specialising in risk management related to IT. Many had over 20 years, some up to 45 years, experience of risk management in different companies. Two researchers were also involved, leading the discussions, taking notes and taping the workshop. The workshop had two parts.

The first part aimed at eliciting insights and experiences from the participants regarding how they currently measure and assess risk management work and what problems they find with this (Appendix B). This part was complementary to the three case studies, and aimed to further investigate the current situation. Hence, the questions asked showed many similarities to those in the previous case studies. For the first part the participants were divided into two groups of four, with a balanced mix of organisations and functions.

The second part of the workshop focused on obtaining feedback about a tentative assessment model developed from the literature studies and the issues raised within case studies (Appendix C). The questions asked were partly based on the discussions with the case companies, and partly based on our own ideas about areas in which it could be interesting to obtain practitioners’ insights. By this method, a first ‘market test’ of the constructed model could be made and valuable input from potential users collected. During this session, we first worked with the two small breakout groups (now including an additional high level supply chain officer), before we had final discussions in one large group. The beauty of focus group interviews is that the interaction among the participants creates richer data (Wibeck, 2000, p.7). Comments from one participant will inspire another, which makes this method very useful in exploratory studies where the point is to get as much insight as possible. To keep to the selected topic, focus group interviews stay focused because they are monitored and guided by the researcher (Wibeck, 2000, p.23).
The fourth and final step was to create a synthesis of the theoretical framework, complemented with other frameworks found in parallel with the field studies, data from the case studies and the focus group interview, so as to come up with a cohesive structure that could give initial directions for how to assess supply chain risk management programmes.

2 Theoretical background

2.1 Supply chain risk management and quality management

The interest in vulnerability and supply chain risk management has recently increased in purchasing, logistics and supply chain management research (e.g. Cavinato, 2004; Christopher et al., 2002; Hallikas et al., 2002; Harland et al., 2003; Johnson, 2001; Lee and Wolfe, 2003; Lindroth and Norrman, 2001; Peck, 2003; Ritchie et al., 2000; Sheffi, 2001; Smelzer and Siferd, 1998; Svensson, 2000; Zsidisin et al., 2000; Zsidisin and Ellram, 2003). As the research area is fairly new, most of the contributions so far have been devoted to outlining what supply or supply chain risk management is, to listing important issues and to describing what is driving the current interest in the area. Many of these authors stress the importance of not only focusing on the companies’ own risks, but also trying to take a wider supply chain or network perspective.

Recently, more multifaceted case studies have been published (e.g. Harland et al., 2003; Norrman and Jansson, 2004), and practical guidelines have even been suggested (Peck, 2003). Norrman and Jansson (2004) describe Ericsson’s supply chain risk management approach – a six-phase loop consisting of Risk Identification, Risk Assessment, Risk Treatment, Risk Monitoring encompassing Incident Handling and Contingency Planning. Risk Monitoring was thought to be an important part of the approach but was perhaps the least developed.

The Centre for Supply Chain Risk and Resilience at Cranfield University (Peck, 2003) has developed a practical guide and a self-assessment workbook for supply chain risk management assessment that is based on, among others, Total Quality Management and Six Sigma-oriented concepts and tools. The suggested toolkit consists of tools and approaches like Failure Mode and Effect Analysis (FMEA), Critical Path Analysis, Statistical Process Control, Root Cause Analysis, Benchmarking etc. Peck (2003) also stresses the importance of creating a supply chain risk management culture, and that it should extend the current boundaries of business continuity management to become ‘supply chain continuity management’. The importance of the leadership from the top of the organisation is emphasised to create the needed cultural change.

Zsidisin et al. (2004) show that quality methods, for example, using Malcolm Baldrige National Quality Award criteria, are used as a supply risk assessment technique. Lee and Wolfe (2003) also connect supply chain risk management with quality management, and think that even the dilemma of how security can be improved without jeopardising supply chain effectiveness can be handled through the principles of quality management. One of their suggested strategies is Comprehensive Tracking and Monitoring.

But more detailed discussions on how to assess the supply chain risk management work have not emerged. When measuring or assessment is discussed, the focus is not on the work in itself but on how to measure the risk. Normally it ends up in the traditional
risk map/matrix (see Figure 1) with probability (or frequency) on one axis and impact (consequence) on the other, and where the risk is said to be probability $\times$ impact (e.g. Hallikas et al., 2002; Zsidisin, 2001). Another approach that is used in practice to assess risk consequence is the Business Interruption Value (Norrman and Jansson, 2004).

**Figure 1** The Risk map/matrix

We can see that many risk management activities have similarities with quality assurance programmes (and we have mentioned many authors who make this connection). They both contain elements of proactive and reactive activities and it is imperative to have a balanced mix of both. They are also similar in the sense that it is difficult to link efforts to results, because if nothing goes wrong, is that due to proactive quality work or is it pure luck? The same dilemma is found in risk management: was the no-incident period a result of the risk management work or just dumb luck?

One well-known quality assurance model is the European Foundation for Quality Management (EFQM) Excellence Model as illustrated in Figure 2 (EFQM, 2004). It comprises nine criteria that can be used to assess an organisation’s progress towards excellence. The nine criteria are divided into two broad groups: enablers and results. Enablers consist of Leadership, People, Policy and Strategy, Partnerships and Resources and Processes, whereas results consist of People Results, Customer Results, Society Results and Key Performance Results.

This model has been further developed for assessing risk management programmes that will be described under risk assessment management tools.

### 2.2 Performance measurement

Performance measurement is, according to Neely (1998, p.5),

“... the process of quantifying the efficiency and effectiveness of past action”.

The organisation’s efficiency and effectiveness are the two most fundamental dimensions of performance (Neely, 1998) and hence those two must be measured. Efficiency refers to how economically the organisation’s resources are utilised, whereas effectiveness refers to how accurately the organisation’s products or services satisfy customers’ needs.
However, quantifying the efficiency and effectiveness of risk management work is far from straightforward, and that is also the reason for this research. One way of measuring some kind of progress is to follow up on the risk management activities and measure what has been done in a quantitative way, such as number of risk assessments or number of risk mitigation actions that have taken place during a certain time period. The logic behind this would be derived from the Balanced Scorecard, where different areas are measured and the areas are linked logically, for example that innovation of new products and processes is needed long before the result of the innovative actions is visible in the financial reports. Analogous to this, one might say that an organisation must identify risks, and evaluate and handle risks long before the result of the risk work becomes visible in lower total costs of risk.

2.3 Risk management assessment tools

The literature search produced a number of frameworks on risk management assessment. The frameworks are briefly described below, and some common features are summarised at the end of the section.

2.4 Risk management assessment framework

The Risk Support Team at HM Treasury, UK (2003) adapted the Excellence Model in order to assist government departments in evaluating their performance and progress in improving their risk management capability. The adaptations to the model (Figure 3) are found in the results group, where four result criteria from the EFQM model are compiled into one criterion and risk handling is added.

All criteria are translated into one key question that can be used with or without the supporting question sets and/or quantified maturity scale. Due to space restrictions, the list of supporting questions is excluded from this paper (see risk support team (2003)). The key questions for capabilities are: Leadership: do senior management support and promote risk management? Are people equipped and supported to manage risk well? Are there a clear risk strategy and risk policies? Are there effective arrangements...
for managing risks with *partners*. Do the organisation’s *processes* incorporate effective risk management? The assessment scale for capabilities comprises the following levels:

1. awareness and understanding
2. implementation planned and in progress
3. implemented in all key areas
4. embedded and improving
5. excellent capability established.

The key questions for results are: *Are risks handled well?* Does risk management contribute to achieving *outcomes*? The assessment scale for results comprises the following levels:

1. no evidence
2. satisfactory
3. good
4. very good
5. excellent.

**Figure 3** The risk management assessment framework adapted from the EFQM excellence model from the risk support team, HM treasury, UK

**2.4 Business risk management maturity model**

The IACCM risk management-working group addressed the issue of how an organisation can evaluate, in a quantitative fashion, its level of maturity in business risk management. The group defined four levels of organisational business risk management maturity (Novice, Competent, Proficient and Expert) against four key attributes (Culture, Process, Experience and Application). Each attribute has been further defined using several diagnostic characteristics, with each characteristic described for each of the four increasing levels of maturity.
2.5 Risk management maturity model

The literature study also identified yet another Risk Management Maturity Model from Risk Management Research and Development Program Collaboration. The model developed is to be used as a diagnostic tool instead of a prescriptive model for implementation. By assessing the process maturity (four levels with specific attributes), the users will have a methodology for determining whether or not their risk processes are adequate for their organisation, identifying realistic targets for improvement and producing action plans for developing or improving their risk management process maturity level. By and large, the model has great similarities with the Business Risk Management Maturity Model described above.

The above-mentioned maturity frameworks all have in common a focus on capabilities and how well developed they are. The same kind of reasoning can also be found in Deloach (2000), who declares that in order to achieve successful results from your risk management programme, the organisation must possess certain capabilities. Not only is it important to have certain capabilities; they must also be in good working order and be well established. The proposed way to assess these capabilities is to make a qualitative audit in which the level of maturity is determined. Deloach (2000) presents a ‘risk management capability maturity continuum’ with five distinct levels of maturity accompanied by certain characteristics, attributes and methods of achievement (Figure 4). With this information in mind, one can then assess the overall risk management capabilities as well as evaluate specific risk management processes.

Figure 4  Risk management capability maturity continuums

As the organisation improves its capabilities, the benefits of its risk management programme are enhanced. Deloach (2000) gives the following picture of how extended benefits materialise as the capabilities are enhanced. In the initial stage, risk awareness starts to emerge. At the repeatable stage, one will achieve benefits such as improved...
Assessing performance of supply chain risk management

business knowledge, more attention to risk-reward decisions, improved evaluation of uncertainties and more effective risk-based decision-making. Within the defined stage, one can expect that the organisation anticipates risk better than do its competitors, that there is a linkage between risk management and line operations management, that capital and resources are better allocated, and that the level of risk that organisation takes becomes transparent to all stakeholders. Finally, at the managed/optimised stage, one can expect to find risk management as an integral part of business management, capabilities to capitalise on market opportunities, diversification effects exploited and risk management integrated with business planning and strategy.

The frameworks all emphasise a gradual development of capabilities as the risk management work evolves. They focus on various areas, but they all cover processes and the necessity to measure or assess process maturity. However, it was only the initial framework that tried to link efforts to results in a more strict fashion.

3 Empirical insights

Three organisations were interviewed regarding their risk management work and how it could be assessed. They were chosen because we expected them to provide interesting experiences: the Swedish Civil Aviation Safety Authority tracks incidents and accidents and is responsible for minimising risks in other organisations than their own; Ericsson has worked for some years with supply chain risk management; and DHL manages a huge logistics flow and is an important part of their customers’ supply chains.

Although we did not find much assessment of supply chain risk management programmes, the participants still provided valuable insights and hence short summaries are presented. Ericsson had been working very actively for some years with implementing organisation and processes for supply chain risk management (see Norrman and Jansson, 2004) and has now faced the issue of how to assess and show the progress. As a matter of fact, the inspiration to do this study came during discussions with Ericsson. The Swedish Civil Aviation Safety Authority is an organisation assessing and correcting its risk management work in other transportation organisations; thus they work in a cross-organisational way with logistics companies. Finally, DHL is one of the leading global logistics service providers and its risk management is crucial for its external parties. First their risk management work is summarised, and then their view on how proactive efforts are linked to results.

3.1 Swedish civil aviation safety authority

3.1.1 Risk management work

From a supply chain risk management perspective, the Swedish Civil Aviation Safety Authority is interesting as it has an inter-organisational function of assessing logistics companies’ safety and risk management, focusing on their processes and management. The Authority’s sole reason to exist is to assess third parties’ risk management systems, and thus the idea of conducting a study like this was viewed with considerable interest. Surveillance of aviation organisations is separated into two major areas: one for new aviation companies that want to enter the Swedish market, and one for ongoing surveillance of aviation companies already operating on the Swedish market.
For newcomers, key personnel (nominated post holder) is inspected and granted permission and then their manuals are inspected and approved. Personnel are examined both via different types of knowledge tests and also through interviews to assess whether they have really understood what it means to be a nominated post holder and what responsibilities come with such posts. The manuals are scrutinised for consistency and coverage. When everything is in order, the newcomer is granted operative permission.

The ongoing assessment is built on system surveillance; this means that the Authority cannot check everything in minute detail, but instead reviews the safety management system and makes sure that it works as intended. Here, the similarities with quality management are evident. The only way to control the risks is to control the process for handling risks. However, the Authority does take random samples to make sure that the output from the safety system produces acceptable output. If unsatisfactory results are detected, they then apply a broader and wider scope to assess the quality of the safety system output.

One of the main issues the Authority assesses is the internal revision of the safety system. The aviation corporation must perform an internal review of its safety system every year and document the internal review. Deficits in the internal review are the most frequent observation from the Authority.

### 3.2 Linking proactive efforts to results

Successful risk management work is claimed to start with the hands-on work with the airplanes. Recommendations from the airplane manufacturer on maintenance work are submitted to the aviation companies. Based on flying conditions (flying in corrosive environments, short flights versus long flights, etc.), the maintenance schedule is adjusted to fit them. As time goes by, experience is developed from incident reporting (in Sweden alone some 2500 disruption reports are submitted annually to the Authority from pilots, mechanics, ground personnel, flight control, etc.) and countermeasures can be developed, tested and submitted to concerned organisations and corporations.

The next step is to incorporate those who work with the planes, such as mechanics in the workshops, engineering firms and others, to make sure that procedures and routines are documented, verified and yielding satisfactory results.

Success is achieved when new findings from incident reporting are incorporated into the safety management system and the safety management system expands to embrace more and more factors.

Financial considerations have an impact on risk management work, as the aviation corporations must by law have a number of nominated post holders as well as a safety management system. The cost of running the safety management system and the wages that go to the nominated post holders are the same regardless of whether they are working intensely and proactively or if they do not carry out their duties. Thus, the costs are the same and there is no financial advantage in cutting corners.

### 3.3 Ericsson

#### 3.3.1 Risk management work

Ericsson’s interest in Supply Chain Risk Management (SCRM) increased with the Albuquerque incident, where Ericsson took a major blow because of a fire in a factory
belonging to one of their suppliers (see e.g. Norrman and Jansson, 2004). Business interruption of this kind had happened to them before, but not of this magnitude. The business interruption made it necessary to work proactively with these issues, and a programme was initiated that identified, assessed, managed and monitored the supply chain risks. It also contained areas like business continuity planning and incident handling. A supply chain risk manager was appointed to develop processes and tools, and clear responsibilities and accountabilities for their risks were given to line managers, for example, to supply chain managers. At present, the focus is on the roll out of these risk management processes into the entire organisation, and thereafter to incorporate more of the suppliers in the program as well. A tool for evaluating suppliers has been developed (ERMET, see Norrman and Jansson, 2004) that covers many areas in detail. The different areas covered are business control, financial hazards in the surroundings (natural as well as man-made), hazards at site and business interruption handling. The general experience so far has been that the Ericsson approach is wider and includes more aspects than their suppliers themselves have done before. They have focused more on disaster contingency planning, which is a suitable place to start. It has also been evident that the Ericsson approach has been unique because Ericsson’s suppliers have not had similar reviews from other customers. To get this approach to work, and spread within the supply chain, Ericsson is working both on getting those issues clarified in the contracts, and on working with suppliers to increase their SCRM competence.

A guiding principle in Ericsson’s SCRM work is to know your risk and make informed decisions. ‘This might sound naïve’, the respondent says, ‘but we now have proper tools for assessing risks’.

Incidents at suppliers’ sites are probably not reported as accurately as they should be. This hinders development of an incidents database and consequently development of countermeasures that could be deployed to reduce the likelihood of incidents. It will take a mind shift to get all data in.

3.4 Linking proactive efforts to results

At the time of this study, no direct assessment of the supply chain risk management work had been made, but efforts had been initiated to develop a process and tools for Risk Monitoring, an area that should include ‘to review the risk management process to verify its suitability and efficiency’. The direct link between proactive risk management work and end results had been visible, for example, in business insurance premiums paid. There had also been a number of incidents without much final impact due to improved proactive as well as reactive risk management.

3.5 DHL

3.5.1 Risk management work

In this case, represented by a local branch of the company, the company had adopted a stepwise method to its risk management. Risks have been identified, not always by analysing statistics of incidents, but rather by concentrating attention and actions on specific risk areas and following up on the outcome of these activities. Qualitative assessments of uncovered areas have guided the risk manager to where to focus his attention. Their risk management work started some 20 years ago when they began to
question the value of their insurance for damaged and lost goods. All claims handling and administration had to be done by DHL themselves, and they felt that the value of having insurance was not clear. So they cancelled the insurance, took the costs internally, assumed their own risks and allocated the costs to the business managers in the line organisation. The outcome of this change was that the true costs of damages become visible and managers started to track the cost of damaged goods and came up with countermeasures to bring the cost down.

The next big step when the high frequency damages were sorted was to identify the worst thing that could happen to them: a real blow that affects dividends to shareholders. The biggest thing that could happen is a terminal burning down. The way to handle this was to analyse previous fires, and it was found that fires often start when the terminal is empty at nights. The countermeasure then became necessary to run the terminals round the clock and to make sure that they were always manned. By doing so they could send an early alarm to the fire brigade and hopefully reduce the damage.

Lately they have been exposed to organised crime, and they have developed methods to counter those risks.

3.6 Linking proactive efforts to results

Specific risks have been scrutinised, and countermeasures have been developed and deployed. One common problem, described above, has been finding a representative cost for the risks and allocating the cost to the line management directly. The stepwise approach has made it fairly simple to assess whether a certain proactive effort has yielded any results. The risk manager has often been forced to justify his reason to exist to upper management, and thus he has an undeniable interest in assessing risk management work. Risk management is successful when existing and new risk can be accommodated within the risk management work. The risk manager argues that there is no way to achieve a 100% risk free business because that would require unlimited resources devoted to risk management. Instead, successful risk management is realised when you reach a level where the value of extra-added resources is greater than the cost of those added resources.

3.7 Summary cases

The risk management work in the preceding three case studies has some commonalities and differences. Firstly, measuring the impact of risk management work is essential to the risk managers, as they need to prove that they add more value than cost to the business and demonstrate how this should be communicated to the rest of the organisation. This was clear in both the DHL case and in the Ericsson case, whereas in the Swedish Civil Aviation Authority (SCAA) case, the financial dimension was not stated explicitly. Secondly, data input to risk management work differs substantially. In the SCAA case, quantitative data regarding near misses, incidents and accidents constituted the backbone for identifying risks and working with risk mitigation activities. In the DHL case and the Ericsson case, qualitative facts are used as input to the risk management process, but Ericsson acknowledges that quantitative incident and near-miss data could drive risk management even further. Finally, the three cases have also reached different far regarding assessing organisational capabilities and personal traits as
determinants of risk exposure. SCAA has substantial experience of assessing people and judging the appropriateness of certain individuals in important positions, whereas Ericsson has recently begun working with supplier risk management capability development as a way to expand the risk management work.

3.8 Workshop: general discussion on assessment of risk management work

The first part of the focus group interviews dealt with a number of issues (Appendix B) related to how the respondents were currently working at assessing the performance of their risk management efforts.

In general, the participants agreed on the difficulties of assessing and managing the success of risk management work. Crucial issues included how to communicate risks to the rest of the organisation, especially high-level decision makers, and how to compare different kinds of risks.

Two main groups of measures were discussed: more output-oriented financial metrics and more process-oriented metrics. The latter could reveal the organisational area covered by the risk management work and to what degree different risks had been addressed. Successful risk management work was argued by some to be basically the state when you are able to convert risk management lingua into financial terms and economic consequences, since you are then on speaking terms with the rest of the organisation and it becomes possible to drive the risk management work forward successfully. Obtaining financial numbers on risks, however, is not easy – some examples used were Business Interruption Value (based on the time it takes for the business to recover), the cost for Annual Loss Expected (ANL) or Estimated Maximum Loss (EML). The idea was to calculate risk management’s impact on those measures and subsequently prove that the risk exposure has gone down. Some practical problems noted were that the better you are at identifying risks, the higher the values grow. Further, the business interruption costs in volatile industries were argued to be dependent on the order situation (many orders – high costs, few orders – low costs, etc.). Another output-oriented financial measure mentioned was insurance costs, but the experience here was that in some industries the companies themselves could simply absorb those costs to some extent: of major importance was instead global business in general as well as the risk of the industry it belonged to. Another way used was to summarise the risk exposure by developing a ‘top-10’ or ‘top-30’ list of risks and estimating an ANL or EML for this – and also the impact of those numbers by action taken. However, the most concrete way currently used was to show that frequency and impact of accidents and incidents has gone down as a result of the Risk Management (RM) work carried out in the organisation.

A more process-oriented measure was to show the RM organisation’s efficiency and effectiveness by first creating a business plan for the RM organisation and then following up progress. With that came detailed strategies, prioritised areas and concrete actions to be carried out by the RM organisation. These actions can then be followed up, and the compliance to plan can be assessed. This allows for long-term strategies to be broken down into hands-on actions that will improve risk management capabilities in various ways. This was done by using different colours to communicate status and progress. Regarding reporting and measures, the risk manager normally
reports compliance on planned actions, different monthly reports, follow-up of incidents and accidents, revisions and audits and a top-10 list of present risks to his/her manager.

There were examples of risk managers with no clear incentives, while other incentive programmes for risk managers were designed to be linked to actual damages, negotiation skills and deviation from main business goals, relations to insurances and insurance costs.

On the issue of what should be measured to cover the essence of risk management work, some of the respondents agreed on human life, environment and property in that order, whereas others were more hard-core capitalists and argued that impact on cash flow was the only relevant measure.

The main difference between dealing with supply chain risk management as compared with regular risk management is the inter-organisational context, and thus the extended scope regarding responsibility and authority become incredibly important. This also highlights the importance of clear interfaces between actors in the supply chain so that there should not have to be any discussion about who has taken the risk exposure and the related outcome of doing so. At the same time, when outsourcing has become commonplace and consequently prolongs the supply chain, transparency has diminished, leading to a distorted view about how much risk the whole supply chain has been exposed to.

3.9 Workshop: comments regarding the tentative model

The second part of the workshop focused on getting professionals’ feedback on the suggested tentative model for assessing the performance of supply chain risk management programmes (Figure 3). Most thought the tentative model could be quite useful, as it was very easy to communicate, had a clear terminology and language, and seemed to cover many important areas. Its holistic approach, combining more qualitative managerial areas and more quantitative output metrics, was appreciated. The model seemed to bring some order into the field, and by having its roots in quality management and auditing, its adoption was believed to be unproblematic. Further, the underlying questions seemed to be quite easy to understand.

But practitioners working on a more operational level asked, as a complement to the more general framework, for a more detailed framework and customised tools to be able to use it on plant level. Others argued that such a generic framework must be general, and that it is subsequently each company’s duty to detail and customise it. A perhaps more important observation was the need for a clearer explanation of the model’s causal logic – how the output was affected by the other parts of the model. Some areas that the model missed were the speed by which an organisation understands a new risk area (learning and innovation) and how to avoid and minimise duplication of risk management related work.

The tentative assessment model was considered to be useful both for internal usage as well as for assessing external partners. However, as it seemed difficult to standardise the metrics, the model was thought to be better for assessing status and development (tracking the progress made by one single organisation over time) than for standardised benchmarking. One issue raised was whether the model determines whether the risk manager works with the right issues and one metric proposed was the ratio between the time a manager uses for planned processes in relation to unplanned ‘fire-fighting’.
4 Towards a tentative model for assessing supply chain risk management programmes

When developing frameworks or guidelines we believe that they should not be too strict or too detailed, as this might hinder adjustments and implementation efforts. Thus our ambition is not to prepare a model that explains in minute detail exactly what to do and how to do it. Companies that find the general framework interesting have to customise the model to fit their context and needs.

Experiences from practice and theory say that it is not always possible or manageable to measure the immediate output from a dedicated set of activities. The best example comes from the balanced scorecard that addressed this issue by questioning the extended usage of financial measures when predicting or assessing the performance of an organisation. The financial measures are the ultimate indication of the organisation’s efforts. However, financial measures lack predictive power, and that is why the measurements must be balanced with forward-looking measurements such as innovation, customer satisfaction and internal process performance as the balanced scorecard suggests. Similarly, we see the risk management assessment framework as very promising as it is; it offers a well-balanced set of assessment areas from leadership people and partnerships to actual outcomes of the risk management work.

Based on the Risk Management Assessment framework, we would like to propose a tentative model (Figure 5) for assessing supply chain risk management. Central to the coming discussion will be how the supply chain aspect is included in the framework. First, the key questions and underlying questions should be adapted to the supply chain perspective. To exemplify, the key questions could be changed to: Leadership – do senior management support and promote supply chain risk management? Are people equipped and supported to manage supply chain risks well? Are there a clear risk strategy and risk policies for the supply chain? Are there effective arrangements for managing risks with supply chain partners? Do the organisation’s processes incorporate effective supply chain risk management? Are supply chain risks handled well? Does supply chain risk management contribute to achieving outcomes? The approach is to go through all boxes in the Risk Management Assessment Framework and, by using input from theory and empirical data, derive a model for assessing Supply Chain Risk Management.

4.1 Risk leadership and risk policy and strategy

Assuming leadership in an organisation is a role for management. It is a challenging job that requires hard and dedicated work in order to make the organisation function as one entity with a common set of goals and a coherent performance measurement system that is well integrated and gauges the success of the organisation. In a supply chain setting the challenge becomes even harder, as there are organisational borders to cross and differences in what type and level of risk an organisation is prepared to take. The amount of risk an organisation is prepared to take is related to what type of business model the organisation operates under and thus what kind of risk leadership is present in the organisation. Taken all together, risk leadership, risk policies and strategies are closely linked to what level of risk the organisations are willing to take, thus making it very difficult to manage the supply chain risk exposure as one entity. However, risk leadership becomes even more desirable since supply chain risk management operates in
an inter-organisational setting, making clear and decisive risk leadership paramount. In the Ericsson case, it is obvious that Ericsson is now trying to take on the risk leadership and develop their partners to also improve their risk management. The Aviation Safety Authority has a role to assess and audit other companies, and they have hence an important control function. In a supply chain perspective, we hence see the capability to understand how a supply chain functions, and its differences versus a single company, as important, as well as how risk consequences could escalate in a supply chain setting. Other issues to assess could be what functions are really involved in risk management work – are such functions as supply chain/logistics and purchasing involved, or is it still a matter for only the more plant-oriented security function and the more finance-oriented corporate risk management?

**Figure 5** A tentative model for assessing supply chain risk management programmes

4.2 **People**

As highlighted by for example Peck (2003), setting a culture for supply chain risk management is important, and whether this has succeeded or not must be assessed. Other things to find out are whether people are aware of the supply chain context and if they are using their RM tools and techniques also to work with suppliers and sub-suppliers. Ericsson is obviously trying to create a supply chain risk management culture both internally and within their suppliers and sub-suppliers. Ways of doing this include specifying requirements on RM work in their contracts, as well as offering help on how to develop RM capabilities (see Norrman and Jansson, 2004). Both in the Ericsson case and in the DHL case, an important issue was to make the line management responsible. Finally, the Aviation Safety Authority showed how people within other organisations could be assessed regarding knowledge and understanding of their responsibilities. Examples of what might be assessed more quantitatively could be number of people trained, hours of training, people committed to the supply chain risk management approach, etc.
4.3 Supply chain partnerships

In many regards, partnerships are key to supply chains, and hence we rename this ‘supply chain partnerships’. By developing and expanding the partnerships with customers and suppliers, it ought to be possible to bridge some of the issues presented under ‘risk leadership and risk policy and strategy’. Close relationships in which risk exposures and willingness to take risks are communicated across the supply chain will most likely improve the risk management work from a supply chain perspective. However, an important issue raised during the workshop was the need for clear interfaces. Are issues like risk transfer and risk sharing well thought through? The number of contracts in which risk management work by the supplier is considered, or in which the supplier should demand risk management programmes by its sub-suppliers, could be quantified.

4.4 Proactive supply chain risk management processes

We would like to emphasise proactive risk management work even further, and choose therefore to rename the box ‘proactive supply chain risk management processes’. At the same time we add the actual subprocesses: identify risk, evaluate risk, manage risk and monitor residual risk and make contingency plans. Number of risk identifications and assessments made of suppliers, sub-suppliers, critical components, etc., are examples of what could be measured, as well as number of suppliers and critical components assessed. Other more quantitative indicators could be number of risk mitigation actions taken or line managers appointed to be responsible for risks in different supply chains. Examples from the workshop were organisational area covered, how far implementation had gone (indicated e.g. by different colours) and how risks associated with the ‘top-30’ list changes. Still others are how suppliers and sub-suppliers work with contingency plans, and how we ourselves are driving those efforts by our partners. It is also important that risk managers work with the right issues and one metric proposed was the ratio of used for planned processes in relation to unplanned ‘fire-fighting’. Finally, the fact that an assessment might have been started is a proactive action in itself.

4.5 Reactive supply chain risk handling

Again, as in the previous paragraph, we emphasise the reactive risk management work under this heading, and we chose to rename it ‘reactive supply chain risk management processes’. Here again the actual processes are incorporated into the figure: incident handling, accident handling and execution of contingency plans. In the SCAA case, incident reporting was seen as valuable input data for improving the risk management work even further. Similarly, the focus should be on how we are working with understanding what is happening with ourselves with regard to risk sources in other parts of the supply chain, and how suppliers and sub-suppliers are doing when reaction is needed. Some indicators here could be the number of incidents handled well, number of incidents handled poorly, lead time to react and act, or how well the developed contingency plans and crisis plans are followed by the organisation when something happens.
### 4.6 Outcomes

As outcomes, we would like to be more explicit and specify ‘Achievement of business objectives’, ‘cost of risk and risk management’ and ‘health and safety’, because our empirical findings showed that risk management programmes are generally geared towards these outcomes. Examples of what could be measured are number of risk sources where probability or impact have been reduced, to what level total ‘risk’ has been reduced (by calculating probability $\times$ impact, Business Interruption Value or other metrics), reduction in insurance premiums (resulting from insurance companies’ finding that the risks have decreased), etc.

We also add, for illustrative purposes, two bars at the bottom of the framework that represent what kind of data is needed or dealt with in the various criteria. The results are or should be, quantifiable, such as reports on incidents, accidents and execution of contingency plans. Likewise, outcomes such as cost of risk, deviation from business objectives and ultimately health and safety measures are quantifiable by nature. At the other end of the framework, capabilities are assessed on their maturity with qualitative measures (see Risk Support Team (2003)).

### 5 Concluding discussion

Based on current research into supply chain risk management, we have addressed the issue of how companies’ efforts in this area could be assessed. This paper should be seen as a first initiative to spark a discussion about supply chain risk management assessment frameworks. This paper touches upon findings from theory and practice, but has no ambition to delivery deeply into either theory or practice; rather, it seeks to take fragments from both worlds and propose a framework that can be challenged by academia and practitioners. Our main contribution has been to further develop a framework, focusing on Risk Management, by adding features that could make a difference from a supply chain perspective.

The managerial benefits of this model are that initial achievements can be made with minor efforts in confined areas. But in order to harvest the full effects, one must address and develop all aspects of supply chain risk management capabilities. Internally it must be understood that the success of risk management work is difficult to assess by tangible output, and that one approach could be to try to measure the internal capabilities and actions taken. Externally, making sure that your supplier takes responsibility for its risk management process is not simply a matter of sending out some instructions on what to do. You, as a buying company, have to make sure that the supplier has fully understood what it is all about and that he has the right attitude toward and understanding (e.g. capabilities) of the complex nature of supply chain risk management. The cross-organisational feature makes it even more difficult, but yet crucial, to work with supplier-related capability development.

Communication, both to high-level decision makers and line people working close to the risk sources and risk consequences, was seen by the risk managers involved in the study as an important area. The proposed framework was appreciated as it provided useful terminology, covered many relevant areas and was quite logically structured. However, to be used within an organisation or supply chain, it has to be further detailed and customised to the actual context.
One underlying assumption in the framework presented here is that proactive risk management work is positively correlated to decreased total cost of risk. It would not make sense to assess the capabilities part of the framework if one did not think that it would in some way be connected to lower total costs of risk even though the exact causal linkage might not be fully comprehensible. But, on the other hand, if the reader agrees with the underlying assumption, it becomes clear that assessing capabilities, as proposed here, is the right way to go for making an informed statement about an organisation’s ability to handle supply chain risk management work.

Acknowledgements

The research has been partly supported by VINNOVA, the Swedish Agency for Innovation Systems, and ESCA (Ericsson Supply Chain Academy)

References


Notes

1International Association of Contract and Commercial Managers.

2The program is collaboration involving: INCOSE Risk Management Working Group; Project Management Institute Risk Management Specific Interest Group; UK Association for Project Management Risk Specific Interest Group.
Assessing performance of supply chain risk management

Appendix A

Case study question regarding measurement/assessment of risk management work

Part A (overall questions regarding risk management work, both internally and in a supply chain perspective).
- Describe your current risk management work.
- What is success in risk management work?

Part B (more specific questions regarding measurement/assessment of risk management work, both internally and in a supply chain perspective).
- How do you currently assess your risk management work?
- What tools are used?
- What principles guide the assessment?
- What variables are measured/assessed, quantitatively and qualitatively?
- What is reported about actual accidents and incidents?
- Are ‘near miss’ incidents reported, and, if ‘yes’, how?
- Are overall circumstances like risk awareness in the organisation, management support and policies assessed?
- Are the financial impacts of risk management work measured?

Appendix B

Focus group discussion question regarding measurement/assessment of risk management work

- What and how are you measuring and assessing currently?
- How is the data captured, what tools and systems are used?
- What is easy to assess and measure in risk management work?
- What is difficult to assess and measure in risk management work?
- What is success in risk management work (and is this measured)?
- How can the risk management organisation’s efficiency be measured?
- What do you report to your managers?
- How are incentives designed for risk managers?
- What area should be assessed and measured to grasp the core of risk management work?
- What is the difference between assessing risk management work in ‘supply chains’ in comparison to traditional ‘risk management’?
- How can potential differences be addressed?
Appendix C

Focus group discussion question regarding the tentative assessment model

- What are the strengths and weaknesses of the model?
- How would the assessment model work in your organisations?
- What would it cover?
- What would it miss?
- How easily could data be collected to assess the different parts?
- Do you currently assess something proposed in the model, and if so what are the experiences?
- How should the supply chain dimension be incorporated?